INSIDE: FLYING WITH THE FWP "AIR FORCE"

# Montana Outdoors

MONTANA FISH, WILDLIFE & PARKS | $4.50

NOVEMBER–DECEMBER 2024

## OUT OF THE SHADOWS

Shining a light on Montana's 1,100-plus moth species

IN THIS ISSUE:

MAKING AG LAND AFFORDABLE

BEAR SPRAY: NONLETHAL DETERRENT

UNBELIEVABLY, THEY ARE STILL SHOOTING RAPTORS

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# Montana Outdoors

NOVEMBER–DECEMBER 2024

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Montana Outdoors

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**MAJESTIC** A golden eagle soars over a mountain grassland in northwestern Montana. See page 34 to learn why people are still shoot these regal raptors. Photo by Donald M. Jones.

**COVER** The beautiful white-lined sphinx moth is just one of more than 1,100 moth species recently documented in Montana. See our story on page 16. Photo by Jody Ann.

## DEPARTMENTS


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### Passing it on

A friend recently gave me a copy of *Montana Outdoors*. What wonderful information and photographs. The issue had a fascinating article on grassland bird identification as well as a great piece on sketching the natural world. I gave the issue to my 15-year-old neighbor, who loves drawing.

Gwen Myers
*St. Paul, MN*

### Back in the day

Your sidebar in the article "Montana's Beloved Browns" in the September-October issue was super. I also experienced recapturing a large brown by electrofishing at the same spot in Michigan's Boardman River in 1955 and 1956.

Apparently, the warming climate is taking a toll on some rivers with higher temperatures during low flow. The Madison River in the Three Dollar Bridge area, where I and family members fish, seems to be holding its own regarding temperature and despite increased pressure. Montana's clear skies and cool nights help minimize average daily water temperatures, which allow trout to survive daily highs. I was a fisheries biologist and then a pollution biologist for Montana Fish and Game from 1959 to 1962, and in 1961 I measured 84 degrees F. in the Big Hole at Twin Bridges and there was no sign of dead or dying fish. The fish were apparently tolerating high midday temperatures as long as there was cooling at night.

That was an amazing Montana state record brown trout you showed from the Marias River. In 1960 there were a few rather skinny rainbows below Tiber Dam and lots of *Cladophora* algae. Fish had wads of the algae with some midges in their stomachs. That was a great move introducing browns into that fishery.

MONTANA'S
BELOVED
BROWNS
Though not native, this hardy and hard-to-catch trout has firmly established itself in the Treasure State.

I was disappointed that your May-June "Working Lands" issue contained only one sentence on Montana's stream access law. That unique legislation represents lots of hard work by many people and needs to be emphasized and defended.

Gene Welch
*Sammamish, WA*

### Notes from perhaps our most far-off subscriber

I have just received your September-October issue and enjoyed every page. Whilst I found your article about brown trout interesting ("Montana's Beloved Browns"), you should know that the trout fishing over here for browns and rainbows is up with the best in the world, and the small size you guys catch...well, we wouldn't catch and release them—we'd use 'em for bait!

While New Zealand has a wide range of deer, wild pigs, and goats for hunting without any limits or license requirements—for years the government actually paid hunters a bounty on such animals—we don't have any dangerous carnivores or snakes to worry about. The only danger could be from hunting wild pigs.

The New Zealand way of harvesting these tasty animals is to use trained dogs to find and hold the pig. The hunter sits on the pig's back, lifts its lower jaw, and plunges a long knife into its heart. Dangerous? Possibly. Foolhardy? Definitely!

Of course, you could shoot the pig, but there is a risk of accidentally shooting your dog.

I have found the informative articles in your previous issues about grizzly bears fascinating reading, but I find the prospect of your rattlesnakes rather frightening. Have you published any articles about them? If you have, could you possibly send me a copy, as I am sure I would find it most informative and even soothing.

**"By the way, I live 7,810 miles from Helena, Montana. Am I your most distant reader?"**

Many thanks! By the way, I live 7,810 miles from Helena, Montana. Am I your most distant reader?

David Jennings
*Geraldine, New Zealand*

### Archaeological clarification

I'd like to offer a few factual corrections to "Back to Basics: Longbows" (September-October), which contained a great deal of wonderful information.

Ishi was not the last surviving member of the Yana Tribe. He was the last of the Yahi subgroup of the Yana. The Yana still live as part of a federally recognized tribe in California.

The Clovis people, dating back over 13,000 years ago, made spear heads but did not use arrows or make arrowheads. Evidence indicates that bows and arrows were not widely used on the Great Plains and in the Rockies until about 1,500 years ago.

The names used by the Shoshone-Bannock today for one of the bands of Shoshone that occupied the greater Yellowstone area (the Sheep Eaters) include Tukudika, Tukudyka'a, or Tukadika.

The Tukudika used wooden bows in addition to their sheep horn bows.

The Neolithic refers to the time period in Europe, Asia, and Africa when people began developing agriculture. The Neolithic is not a term that archaeologists use to describe North American history.

One of North America's largest obsidian sources, if not the largest, is Obsidian Cliff in Yellowstone. Much of the obsidian for stone arrowheads made in this region came from Obsidian Cliff.

Rachel Reckin
*Helena*

*Editor's note: Dr. Reckin is one of two FWP archaeologists. It was an oversight on my part not to ask one of them to review the longbow article before publication.*

### CORRECTION

The article "Montana's Beloved Browns" incorrectly stated that the Beaverhead River is lined with alders. In fact, those shrubs are mostly willows. The error was the editor's, not the author's.

# Cashew Pheasant Curry

By Tom Dickson | Preparation time: 30 minutes | Cooking time: 30 minutes | Yield: 4 servings

I love a recipe where I can throw a bunch of ingredients in a pot, let it cook while I feed the dogs or clean up the prep mess, and *voila*!—a restaurant-quality meal for me and my wife.

This recipe requires a fair number of ingredients, but all are readily available. It contains the can't-miss combination of onions, garlic, ginger, tomato, cumin, and curry powder, but adds another layer of nutty taste and creamy texture with the ground cashews added at the end.

I throw in some chopped cauliflower because my wife likes a vegetable with dinner, and often I'm too lazy to make a salad or side dish.

This recipe, adapted from Charmaine Solomon's *The Complete Asian Cookbook*, works with the breast and thigh meat of pheasants, dusky (blue) or ruffed grouse, or chicken (the meat used in the original version). ■

—*Tom Dickson is the editor of* Montana Outdoors.

## INGREDIENTS

½ stick (¼ c.) unsalted butter
2 medium onions, finely chopped (2 c.)
2 large garlic cloves, finely chopped
1 T. finely chopped peeled fresh ginger
3 T. curry powder
2 t. salt
1 t. ground cumin
½ t. cayenne
3-4 pounds breasts and/or thighs of pheasants or other birds, cut into 1-inch chunks
1 (14.5-ounce) can diced tomatoes
¼ c. chopped fresh cilantro
½ lb. cauliflower, chopped into 1- by 1-inch chunks (optional)
¾-1 c. cashews (¼-⅓ lb.)
¾ c. plain whole-milk yogurt
*Accompaniment:* cooked jasmine rice or basmati rice
*Garnish:* chopped fresh cilantro, handful of golden raisins (optional)

## DIRECTIONS

Heat butter in a 5- to 6-quart wide heavy pot over moderately low heat until foam subsides. Add onion, garlic, and ginger, stirring, until softened, about 5 minutes.

Add curry powder, salt, cumin, and cayenne and cook, stirring, for 2 minutes. Add meat and cook, stirring to coat, 3 minutes. Add tomatoes, including juice, and cilantro and bring to a simmer.

Cover and simmer gently, stirring occasionally, until meat is cooked through, about 20 minutes. Ten minutes before the meat is done, add the chopped cauliflower and stir into the mixture.

Just before serving, pulse cashews in a food processor or electric coffee/spice grinder until finely ground. Add to curry along with yogurt and simmer gently, uncovered, until sauce thickens, about 5 minutes. Serve over cooked rice and garnish with chopped cilantro and raisins.

Scroll to Venison then click Red Rooster Braised Venison, Perfect Braised Venison, and Braised Portugese Venison Shanks.

PHOTOS: SHUTTERSTOCK

## Grandma would so approve

If I've written it once, I've written it a thousand times: When cooked correctly, shanks can be the tastiest part of a deer or elk. So don't leave them behind after field dressing or just use the meat for burger.

The key to transforming these sturdy portions of a wild ungulate is to braise the meat: cooking at low heat with wine or other liquid for several hours. This magically transforms all those tough meat tubes surrounding the shank bones into chunks of succulent fork-tender meat, like the pot roast Grandma used to serve for Sunday dinner.

Over the years, I've prepared roughly 150 shanks this way, always resulting in Grandma-worthy meals.

***Tip:*** If the meat isn't fork tender after cooking as directed, cook for another hour.

Scan the QR code at right to see three delicious braised shank recipes featured in previous issue of *Montana Outdoors*. ▶

# Mule deer distribution as important as overall numbers

It's frustrating to go hunting and not see the animals you're after. That's especially true if your expectations are higher than what you actually observe.

Many mule deer hunters in eastern Montana have been experiencing that disappointment in recent years. I understand how hard that can be. I hunt deer, elk, and waterfowl and know what it's like to not see as much game as I expect to see.

The mule deer population in eastern Montana is substantially down from the long-term average. That's due mainly to several consecutive years of extreme drought. Drought reduces food available to deer, especially fawns, which enter winter in poorer condition and are more susceptible to dying from cold or starvation.

But even if overall deer numbers aren't as depressed as some are claiming, the way herds are distributed can create the impression of a regionwide population even lower than it actually is. Here's why:

Because it's impossible to count every deer on the landscape, our biologists conduct aerial survey flights in representative areas to give them a good picture of the overall population (see our article "Eyes in the Sky" on page 24 to learn how that works). During the past two years, FWP biologists found that the state's largest regional mule deer population, in southeastern Montana (FWP Region 7), was down 41 percent from the 10-year average. But that decline isn't uniform on every ranch and tract of public land.

Some hunters accustomed to driving out to public lands in eastern Montana and seeing 100 to 200 deer in a day may now see only 10 or 20. Or fewer. Yet mule deer herds could be abundant on nearby private land or in other parts of the hunting district where those disappointed hunters don't hunt. Distribution varies greatly. Some areas may have as many deer as in previous years, while others could have almost none.

The 41 percent is the *average* across the region.

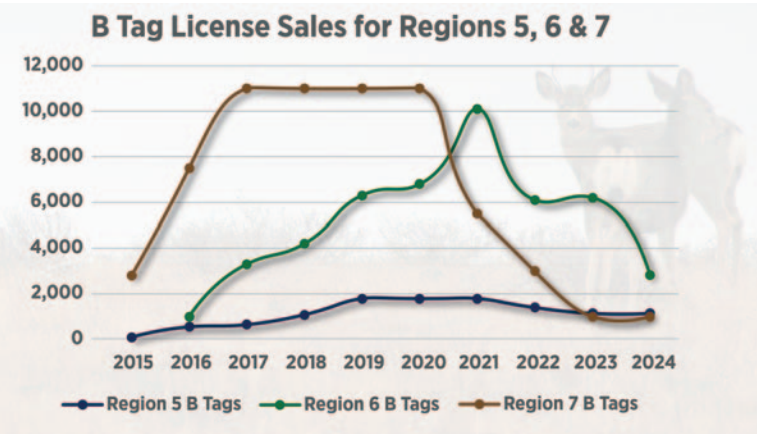
Still, that's a significant regionwide decline. Concerned about the herds, hunters have asked us to reduce doe harvest, and we and the Fish and Wildlife Commission have listened and responded with scientifically sound management adjustments. We began issuing fewer Region 7 Antlerless (B) Licenses starting in 2021 and have scaled back antlerless license quotas by 91 percent since then. Throughout Regions 6 and 7, antlerless mule deer can now be harvested on private land only. Nonresidents can buy only one Deer B License instead of several as in years past, when deer numbers were overabundant and causing farmland depredation. And resident hunters can no longer purchase additional antlerless mule deer licenses during the general rifle season, as before.

**Distribution varies greatly. Some areas may have as many deer as in previous years, while others could have almost none.**

We're hoping these regulation adjustments are only temporary. It takes only a few consecutive mild winters followed by wet springs for mule deer populations to quickly rebound. Though we were encouraged by this past warm winter and rainy spring, much of southeastern Montana was in severe or extreme drought this summer. We at FWP can't do anything to make beneficial weather happen, but we are doing all we can to help mule deer populations stay as healthy as possible until favorable conditions return.

—**Dustin Temple,** *Director, Montana Fish, Wildlife & Parks*

KERRY T. NICKOU




**For the past few years, FWP has been reducing antlerless quotas throughout eastern Montana in response to biologists' aerial surveys and hunters' observations of declining mule deer numbers.** SOURCE: MONTANA FWP

THOM BRIDGE

# EMPLOYEE ENABLER

**STACY PURDOM**
FWP Human Resource Specialist, Helena

**MY ROUTE TO THIS POSITION** at Montana Fish, Wildlife & Parks actually started in Iowa, where I grew up. My mom was born and raised in Butte, and our family visited Montana on vacations. I loved the mountainous West much more than the flat Midwest, so when I married a guy from Helena 28 years ago, we moved here.

I started working for the State of Montana at FWP for three years, then moved to the Board of Crime Control in the Montana Department of Justice, and finally moved back to FWP in 2018, first as an accounting manager and then into Human Resources.

What I like most about my job is getting to help FWP employees who have such passion for their work. It's really true across the board. Whether they are game wardens, wildlife biologists, fisheries technicians, state park managers, or front desk staff, they all have this incredible passion and intensity regarding the department's stewardship mission. We in HR help those employees and supervisors recruit and interview job applicants, handle compensation and benefits, conduct training, foster healthy workplace environments, and resolve conflicts.

We like to say that our job in HR is the stewardship of the department's most precious resource—the people who work here.

Doing that work is super rewarding, and to make sure we fully understand what FWP employees do, we will often "job shadow," where we accompany someone like a wildlife research scientist or fisheries biologist out in the field. That's definitely the most enjoyable part of my job, because I get to see firsthand how our employees' passion for Montana's fish, wildlife, and parks drives their stewardship of those resources.

Photographer **Steven Gnam** was working as a technician on a cutworm moth study in Glacier National Park when he took this 2-second-exposure nighttime photo of moths in flight. The study involved sampling moth populations on the alpine talus slopes of the Livingston Range, where grizzly bears feed on the insects' high-calorie larvae. At night, the moths would fly down to wildflower fields to eat nectar and drink at seeps and areas of snowmelt. After he finished his field work each day, Gnam would set up his portable lights in the wet areas and photograph for several hours into the night. "I think it's cool how this photo shows how the moths made their own art in the sky with their light trails," he says. The straighter light line in the left of the picture frame is a bear biologist's headlamp, Gnam adds. ■

*Editor's note: Learn more about the wonders of Montana's moths on page 16.*

**4** Thickness of ice, in inches, considered safe for walking on frozen lakes and ponds

Two guardian dogs keep an eye out for grizzlies.

# Dogs shoo bears

A recent study found that large guard dogs can deter grizzly bears from farmsteads. The findings, published this past spring in *Biological Conservation*, found that large guardian dog breeds like Anatolian shepherds and Great Pyrenees prevent grizzlies from hanging around farms with grain bins and spilled wheat and barley.

Because the grizzly is federally protected, killing problem bears is legally complicated. And installing electric fencing and other defenses can be expensive.

In 2021, FWP and Utah State University researchers installed five guardian dogs at four homesteads in north-central Montana that had a chronic history of bears foraging spilled grain. The researchers followed 12 grizzlies that had been trapped and fitted with GPS collars and used trail cameras to monitor activity around grain bins.

GPS data show an 88 percent reduction in the number of bears that came near farmsteads with guard dogs compared to those without. "[They] are one more tool in the toolbox to help keep people safe while coexisting with recovering populations of [grizzly bears and other] apex predators," the researchers wrote. ■

OUTDOORS SAFETY

# Ice fishing fashion report

This just in: The latest winterwear for fashionable ice anglers this season is...the same as it is every year: clothing and gear that keep you safe, warm, dry, and mobile.

- **Footwear:** This is more important than any other fashion item. You want warmth, for standing on ice all day, but you also want waterproof, because that ice is often covered in water or slush.
- **Bib overalls:** Because they cover the "chill gap" around your waist where cold air sneaks in, insulated bib overalls are much warmer than even snow pants. Look for ones with waterproof leg fronts for when you have to kneel, which is often.
- **Neck gaiter:** All those veins and arteries in your exposed neck get cold fast and chill the rest of your body in a hurry. Cover your neck with a soft fabric gaiter and keep your blood and body warm.
- **Wool hat over the ears:** Definitely.
- **Gloves:** You want some combination of warm, dexterous, and waterproof. Many ice anglers swear by the neoprene versions.
- **Long underwear, socks, and t-shirt:** Wool and synthetics are best. If cotton gets wet, it actually draws heat away from your body, which is where the term "cotton kills" comes from.
- **Sunglasses:** The sun is especially blinding when it also reflects off the snow and ice.
- **5-gallon bucket:** Use it to carry gear then turn it over for a stool.
- **Maggots in the mouth:** That's a joke.
- **Ice picks:** If you happen to break through the ice, use the picks, kept on a cord around your neck, to grab the ice and haul yourself up out of the water. Then immediately get to a vehicle, turn the heat up high, and drive home to dry off and warm up. Otherwise, you risk hypothermia.

And that's no joke. ■

CLOCKWISE FROM TOP LEFT: MIKE MORAN ILLUSTRATION; MONTANA FWP; SHUTTERSTOCK

HABITAT MANAGEMENT

# Pheasant advocates aim to benefit 1.5 million grassland acres in Montana

Summer wildflowers on the mixed-grass prairie below East Butte in the Sweet Grass Hills.

Pheasants Forever (PF), a national upland bird conservation organization with 14 employees in Montana, recently announced a plan to help conserve 1.5 million acres in the Treasure State over the next five years.

The plan is organized into three goals:

- **Anchoring 750,000 acres of intact grasslands.** "This is work to increase the likelihood that functioning grasslands aren't plowed up or converted to other land uses that don't benefit wildlife," says Hunter VanDosel, state PF coordinator for Montana and Wyoming. "The work includes things like cost-sharing with landowners to set up fencing so they can do beneficial rotational cattle grazing, or helping with a conservation easement."
- **Conserving 600,000 acres of vulnerable grasslands.** "These are grasslands at risk of being converted to crops or being overrun with invasive plant species, so we'll be working on things like cutting encroaching conifers or treating invasives," says VanDosel.
- **Restoring 150,000 acres of converted or altered grasslands.** "In cases where grasslands have been converted to croplands, or they have so much invasive infestation that they no longer function, we'll help with activities like cost-sharing with landowners to seed the land to grasses," says VanDosel.

PF employees will achieve the goals by working with agencies and groups like the federal Natural Resource and Conservation Service and Bureau of Land Management; Montana Fish, Wildlife & Parks; Ranchers Stewardship Alliance; and roughly 9,000 landowners, VanDosel says. "Much of the work is already happening, and what our staff does is provide additional capacity to these other organizations to help them get it done."

Over the past eight years, PF has helped conserve just under 1 million grassland acres in Montana. "Through this new initiative," VanDosel says, "we're shining a light on all this ongoing grassland conservation by us and our partners, and announcing that Pheasants Forever is committed to helping them do even more to reach this ambitious goal of 1.5 million acres over the next five years." ■

OUTDOOR RECREATION

# 6 State Parks for Winter Fun

What to do on a winter weekend? Visit a Montana state park and have the trails, historical sites, and geologic wonders pretty much all to yourself.

**Elkhorn Ghost Town** (east of Boulder): This is one of Montana's best preserved ghost towns, and after admiring the frontier architecture of Fraternity Hall and Gillian Hall, visitors can strap on their snowshoes and trudge through a quiet conifer forest to the town's cemetery.

**Milltown** (east of Missoula): Hike along 3 miles of trails paralleling the Clark Fork River or, when snow cover allows, head off-trail on snowshoes or cross-country skis and explore a vast floodplain to find beaver lodges, deer bedding areas, and coyote tracks.

Elkhorn State Park

**Somers Beach** (southwest of Kalispell). Located on the north shore of Flathead Lake, this park features a half mile of packed sand beach, puddles, and driftwood. Lots of waterfowl and shorebirds in the fall.

**Lewis and Clark Caverns** (southwest of Three Forks): Sick of snow? "The Caverns" is one of the state's driest spots. The trails are often snow-free throughout the winter, so bring your mountain bike or hiking boots. The park also offers candlelight tours of the caverns on six days in December. You must purchase tickets in advance.

**Medicine Rocks** (north of Ekalaka): Here's another park with little snow, and one where you can hike among otherworldly sandstone structures.

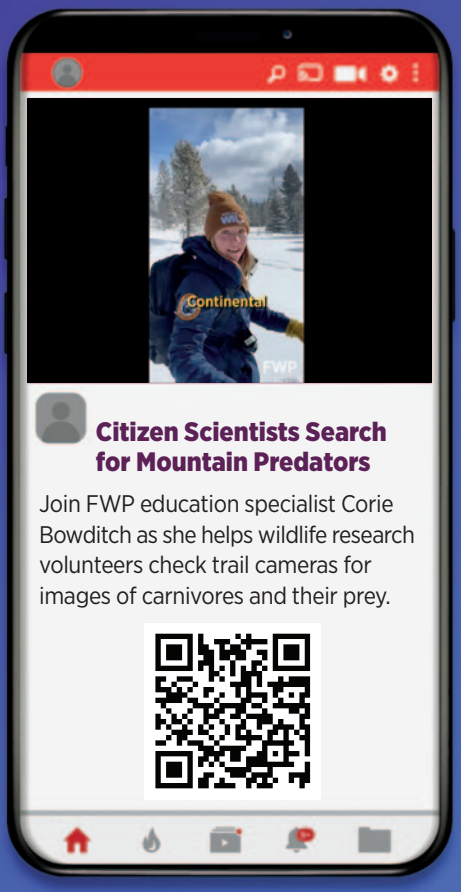
**First Peoples Buffalo Jump** (west of Great Falls): Winter is the best time to visit America's largest buffalo jump because you don't have to worry about rattlesnakes. Check out the awesome visitor center, too. ■

FROM TOP: JOHN LAMBING; MELYNDA HARRISON

# FWP SOCIAL MEDIA SHOWCASE

### Stocking Fish in Mountain Lakes

Watch footage from an FWP helicopter as the pilot drops trout fingerlings from an oxygenated storage tank attached to the aircraft.




### Citizen Scientists Search for Mountain Predators

Join FWP education specialist Corie Bowditch as she helps wildlife research volunteers check trail cameras for images of carnivores and their prey.

### Winged Wizards

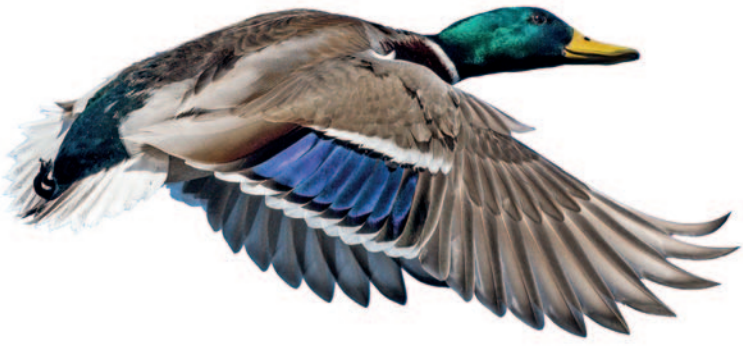
FWP education specialist Corie Bowditch introduces viewers to Montana's merlins, mid-size members of the falcon family.

# LOOKALIKES *Tips for differentiating similar-looking species*

**Mallards** and **shovelers** are both considered "puddle ducks" because they feed in shallow waters. They both also tip their butts up when feeding, unlike divers such as goldeneyes and ringnecks that dive completely underwater. Because drake mallards and drake shovelers both have green heads, these common Montana ducks are sometimes misidentified. ■

## Mallard (drake)

*Anas platyrhynchos*



- **Head:** iridescent green
- **Neck:** white necklace
- **Chest:** dark brown
- **Bill:** golden, narrow at end
- **Eye:** black
- **Back of wing:** blue framed in white

## Northern shoveler (drake)

*Spatula clypeata*

- **Head and neck:** iridescent green
- **Chest:** white
- **Sides:** chestnut
- **Bill:** dark gray, wide at end
- **Eye:** golden
- **Back of wing:** light blue, white, and green

SHUTTERSTOCK

# Yellow flag iris

### What it is

With its showy flowers, yellow flag iris is one of the prettiest noxious weeds in Montana. This perennial native to the British Isles, Europe, and North Africa arrived in Montana in 1925 when it was planted in a garden in Ronan. The invasive plant has since spread across the Flathead, lower Clark Fork, and Bitterroot valleys and has potential to continue east into other river valleys.

### How to ID it

Yellow flag iris looks like most garden irises, with three downward-pointing sepals and three upward-pointing petals. But it's much bigger, standing 3 to 5 feet tall. The flat, erect, bright-green leaves look just like those of a cattail, but iris leaves have a flat base, while cattails show a round base.

### Why we hate it

This pretty plant is actually a big bully, choking out valuable native vegetation like cattails and bulrushes and forming dense monotypic stands in low-lying wetlands and ditches and along stream, river, pond, and lake shorelines. It clogs trout tributaries, irrigation canals, and water pipes and is toxic to wildlife, livestock, cats, dogs, and humans.

### How it spreads

Yellow flag iris is spread by people digging it up and planting it in their gardens. It also spreads naturally when the seeds float in water or when rhizomes break off and are carried downstream.

### How to control it

Like all noxious weeds, yellow flag iris is difficult to control. Small stands can be dug out, but only if the rhizomes are entirely removed. Repeated mowing can help, as can certain aquatic herbicides. Some states have had success using non-native beetles and other insects to control yellow flag iris. ■

*If you see what you think is yellow flag iris, report it to Jasmine Chaffee, Montana Department of Agriculture Noxious Weed Program manager, at 406-444-3140; JChaffee@mt.gov.*

*Illustration by Liz Bradford*



*A quick look at a concept or term commonly used in fisheries, wildlife, or state parks management.*

# "Otolith Aging"

The main ways fisheries managers determine the overall health of trout, walleye, or other fish populations is by monitoring fish abundance (using electroshocking, netting, and creel surveying).

By aging fish, biologists can also determine how fast they grow, how old they are when they reproduce, and how long they live. Biologists then use this information to estimate the number and health of fish in different age groups, or "cohorts," which in turn helps them determine things like the effectiveness of stocking walleye or trout in lakes and reservoirs or the effects of water flows on spawning success.

Biologists determine the age of a fish by examining its otolith. Otoliths are calcium deposits that build up in a fish's skull behind the eye and below the brain, forming what look like small white stones. Also known as "ear bones," the stones help fish orient themselves and maintain balance, acting like a human middle ear.

Collecting otolith samples from silver carp in South Dakota's James River.

SAM STUKEL/USFWS

Otoliths are composed of calcium carbonate and protein, which is deposited at different rates throughout a fish's life. This process leaves alternating opaque and translucent layers. To estimate fish age, biologists cut the otolith into thin slices. Through a microscope, they count the number of layers, like tallying growth rings in a tree. Biologists collect otoliths during warm-weather fish surveys then head to the microscope in winter to see how old the fish are. ■

# *The* AFFORDABILITY FACTOR

Some ranchers are discovering that FWP conservation easements on for-sale properties can help them expand their operations.

By Allen Morris Jones

If you've lived in Montana for any time at all, one of your favorite topics of conversation is no doubt just how fast the state is changing. Driving down Huffine in Bozeman or around the west side of Billings or in that corridor between Kalispell and Whitefish, it's hard not to remark on the new subdivisions, how last year's hay fields are now growing house trusses and Tyvek homewrap.

In this context, there's an improbably important conservation mechanism doing the heavy lifting to keep certain crucial pieces of Montana preserved and, more often than not, in agricultural production.

Sprinkled here and there around the state, roughly 3 million acres of conservation easements—administered by a handful of nonprofit organizations and government agencies—protect wildlife habitat and open space while maintaining that land for crop production or cattle range.

What's more, in recent years some ranchers and farmers are finding that conservation easements on neighboring properties up for sale can make that land affordable for them to expand their operations.

*Allen Morris Jones is a novelist, editor, and publisher in Bozeman.*

## SELLING YOUR DEVELOPMENT RIGHTS

Conservation easements have been around in Montana since 1975, and in wide use since the late 1980s, but they can still be a difficult idea to wrap your head around. Think of them like this: When you buy a piece of property and call yourself owner, what you actually own are a portfolio of rights to the property. These include things like trespass rights, grazing rights, development rights (to, for instance, build subdivisions), and, in some cases, mineral rights to oil, gas, and other natural resources belowground.

> **"We never thought we could afford anything over here," Ostler says, "but the conservation easement brought it down into our price range."**

Conservation easements are voluntary agreements in which the owner sells the development rights while still retaining all the other rights on the deed. Some conservation easements, like those bought by Montana Fish, Wildlife & Parks, may also purchase "sodbusting" rights (preventing the landowner from plowing up intact grasslands). In return, the owner might receive tax breaks, cash, or some other consideration. The easement also provides the reassurance that the land will stay intact—undeveloped—long after the owner is gone. That's especially important to ag families who have lovingly tended their properties for generations. The conservation easement is almost always permanent, traveling with the deed from owner to owner.

ALLEN MORRIS JONES

The specific, intended purpose of a conservation easement is usually to preserve wildlife habitat and open space while still allowing grazing and some other existing ag practices. Agencies and organizations like FWP, Montana Land Reliance, The Nature Conservancy, Rocky Mountain Elk Foundation, and Five Valleys Land Trust all have easement programs that help landowners retain the essential character of their property in perpetuity and, in many cases, protect diverse, high-quality wildlife habitat.

But in recent years, some ranchers and farmers have also been eyeing these preserved parcels for another reason: affordability.

**PROUD OWNER** Nathan Ostler, shown here, and his wife Holli were able to purchase 800 acres of prime grazing and haying land in the Madison River Valley because the property was under a permanent FWP conservation easement. While lessening the value to developers and privacy-seekers, the easements make land affordable to ranchers.

## DOWN TO THEIR PRICE RANGE

Nathan Ostler grew up in Sheridan, part of a large ranching family that he says ran about 500 head of cattle. Sheridan is in the Ruby River Valley—a quiet, Edenic part of the world. It's small-town Montana of the sort that's disappearing elsewhere. And while Ostler would have preferred to stay, the inheritance issue was tricky. "We had to do some estate stuff because there were eight of us kids," he says.

It's not an uncommon story. You're raised to be a rancher, you want to keep being a rancher, but there's just not enough ranch to go around.

Nathan and his brother went off to try their luck elsewhere, first in southeastern Wyoming and then back in Montana near Whitehall. But it wasn't until Nathan and his wife Holli purchased not quite 800 acres in the Madison River Valley in 2018, in the shadow of Sphinx Mountain, that they found a home for themselves and their five children. Pivots in the hay ground, plenty of room for horses, stalls for some 4-H pigs, 1,300 acres of additional land they could rent, elk hunting in the fall, and enough Madison Range alpenglow to last a lifetime. It also sits next to the 3,458-acre Bear Creek Wildlife Management Area, winter range for around 1,000 elk and 250 mule deer. It's a rare piece of ground.

And they could manage to buy it because there was an FWP conservation easement attached to the deed. It dated back to 1994—one of the very first easements purchased by the department. "When we started looking, we never thought we could afford anything over here," Ostler said, "but the conservation ease-

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PRIVATE PROPERTY
HUNTING, FISHING, TRAPPING OR TRESPASSING FOR ANY PURPOSE IS STRICTLY FORBIDDEN
VIOLATORS WILL BE PROSECUTED

**WHAT AG LAND CAN BECOME** Top left and right: As traditional ag land is increasingly bought up by speculators and out-of-state ranch hobbyists, many properties once open to public hunting are being posted or turned into housing subdivisions. Above left and right: Conservation easements protect open space for all and usually allow for traditional ag practices like grazing while also providing habitat for elk and other wildlife.

ment brought it down into our price range."

FWP currently administers 81 conservation easements within Montana totaling 600,000 protected acres—prime habitat for wildlife and open space enjoyed by anyone driving past. Unlike other organizations, FWP's easements require some degree of public access.

In the Ostlers' case, the existing easement not only preserved habitat next to a game range—essential for the ecological health of the Madison Valley—but it also kept it in cattle production, leaving it exempt from the elevated price tags on "amenity" ranches.

These ranches are owned primarily for their recreational or lifestyle value rather than for agricultural production. Their primary appeal for the new owners may be privacy, scenery, or trout fishing. Their value as working ranches often comes secondary.

The absence of new housing potential sours real estate developers on land with FWP conservation easements, and the department's public access requirements, though often modest, make the properties less attractive to buyers looking for solitude.

"When the department purchases a conservation easement, the state is effectively purchasing the inflated value of a property—along with the right to keep grasslands intact," Ken McDonald, head of FWP's Wildlife Division, explains. "Many ranches across the state are now being valued based on their amenity value or subdivision potential, which makes the price much higher than what traditional agricultural land value would usually go for."

**For ranchers and farmers in future years, the best option for enlarging their operations may be to buy property with "FWP conservation easement" stamped on the deed.**

If a tract with a conservation easement comes up for sale, developers rarely are interested, McDonald adds. "But the reduced value can make it affordable to neighboring ag producers."

The original 1994 conservation agreement required hunter access to the Ostlers' new property but didn't stipulate how much. The family opted to enroll in FWP's Block Management Program. Ostler says, "We allow three or four hunters a day—not a lot, because we're so small. I usually just let one party come on, and they can have up to four people. I guess we'll see 60 or 70 hunters in a year."

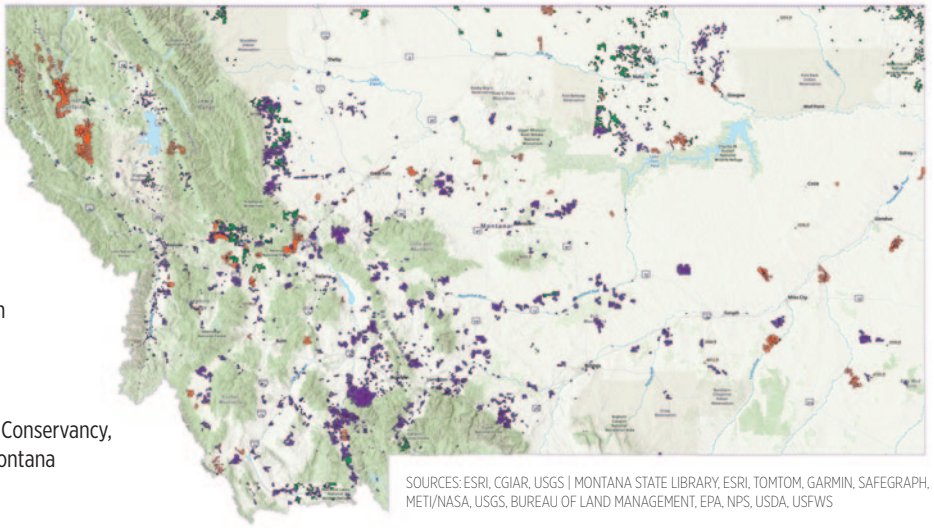
Julie Cunningham, an FWP wildlife biologist in Bozeman, oversees the Ostlers'

CLOCKWISE FROM TOP LEFT: SHUTTERSTOCK; SHUTTERSTOCK; STEVEN AKRE; SHUTTERSTOCK

## Montana Conservation Easements

The state's largest easement holder is the Montana Land Reliance, with 1.4 million acres. FWP's 81 easements total about 600,000 acres. Some of the agency's largest easements are in the Thompson and Fisher river valleys in northwestern Montana.

- Federal easement (U.S. Dept. of Agriculture, U.S. Fish & Wildlife Service)
- Montana Fish, Wildlife & Parks easement
- NGO easement (Montana Land Reliance, The Nature Conservancy, Ducks Unlimited, Rocky Mountain Elk Foundation, Montana Conservation Trust, regional land trusts, and others)



SOURCES: ESRI, CGIAR, USGS | MONTANA STATE LIBRARY, ESRI, TOMTOM, GARMIN, SAFEGRAPH, METI/NASA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USDA, USFWS

**MAKING IT WORK** **The Ostlers at the family's ranch, which sits next to the Madison Range and FWP's Bear Creek Wildlife Management Area. From left to right: Nathan, Kaidyn (age 9, also shown at right with the family's hogs), Holli, Kayzli (age 16), and Treyer (age 15).**

easement. "FWP always stays involved with the landowners," she says, "and I've really enjoyed working with the Ostlers. They're such a nice family. Kids, pets, 4-H. And they have some substantial challenges they're wrestling with out there, especially fence damage, crop depredation, and potential brucellosis from those big elk herds. But they always stay positive."

### MONTANA'S AG CHARACTER

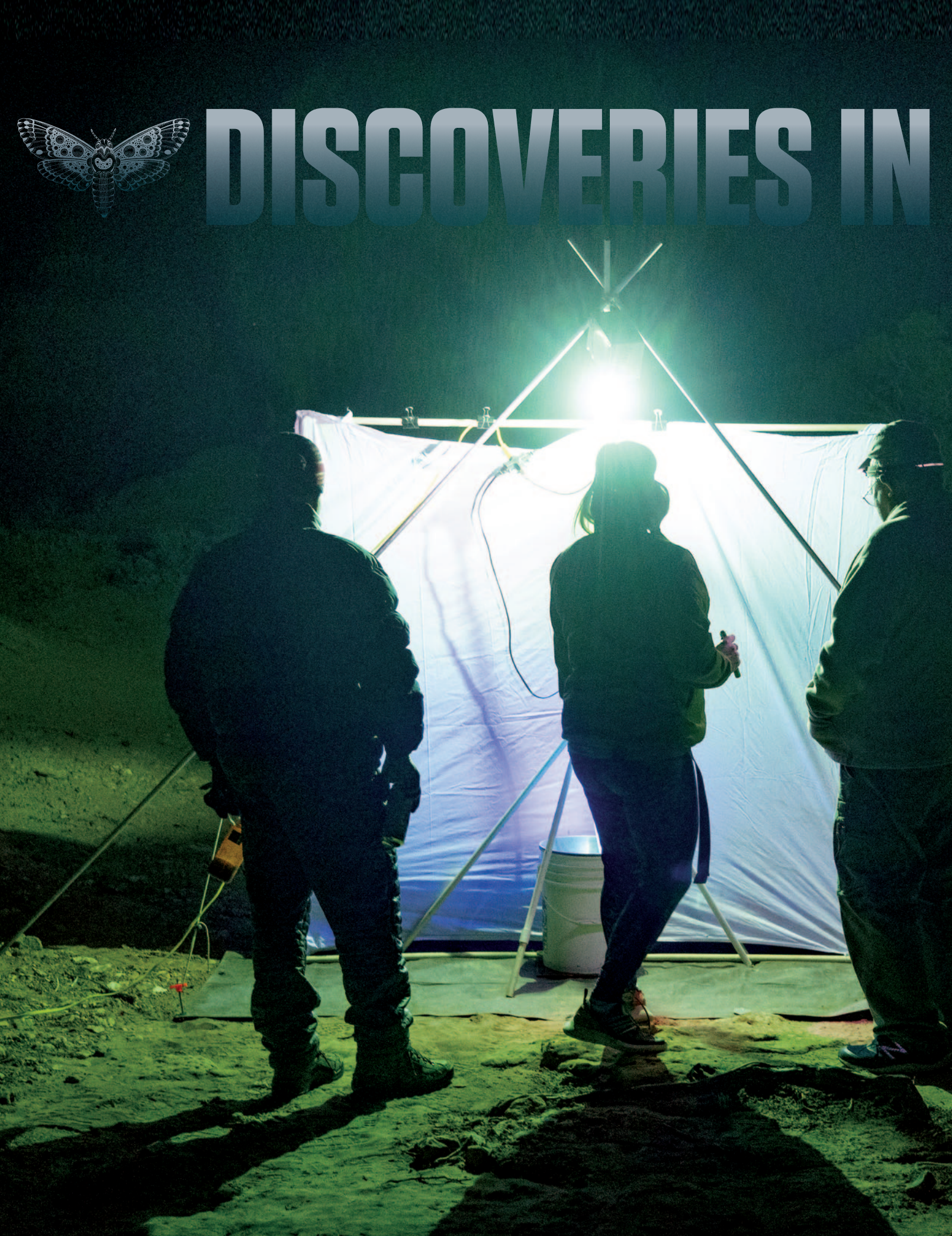
When you look at a map of Montana's conservation easements (above), you're struck first by how much private land (the vast white spaces) there is around the shaded portions (conservation easements). At first blush, the easements don't seem like much—at best, a good freckling across the state. But look closer, and consider the quality of habitat that's been set aside. The benefit to wildlife and to the common good is profound.

"This is a voluntary program," Cunningham says. "And as a piece of land gets sold, the value in the conservation easement is in retaining not only the habitat but also the agriculture on the landscape.

"I think many people can appreciate how important ag land is for the character of Montana," she adds. "I also know that conservation easements may not be for everybody. But for those whose values align with this option, it can be win-win-win for wildlife, the public, and the landowners themselves."

And not just the landowners who originally sell the easement to forever preserve their land. With the way land prices are skyrocketing these days, more future ranchers and farmers may find that one of the best options for enlarging their ag operation is to buy property with "FWP conservation easement" stamped on the deed.

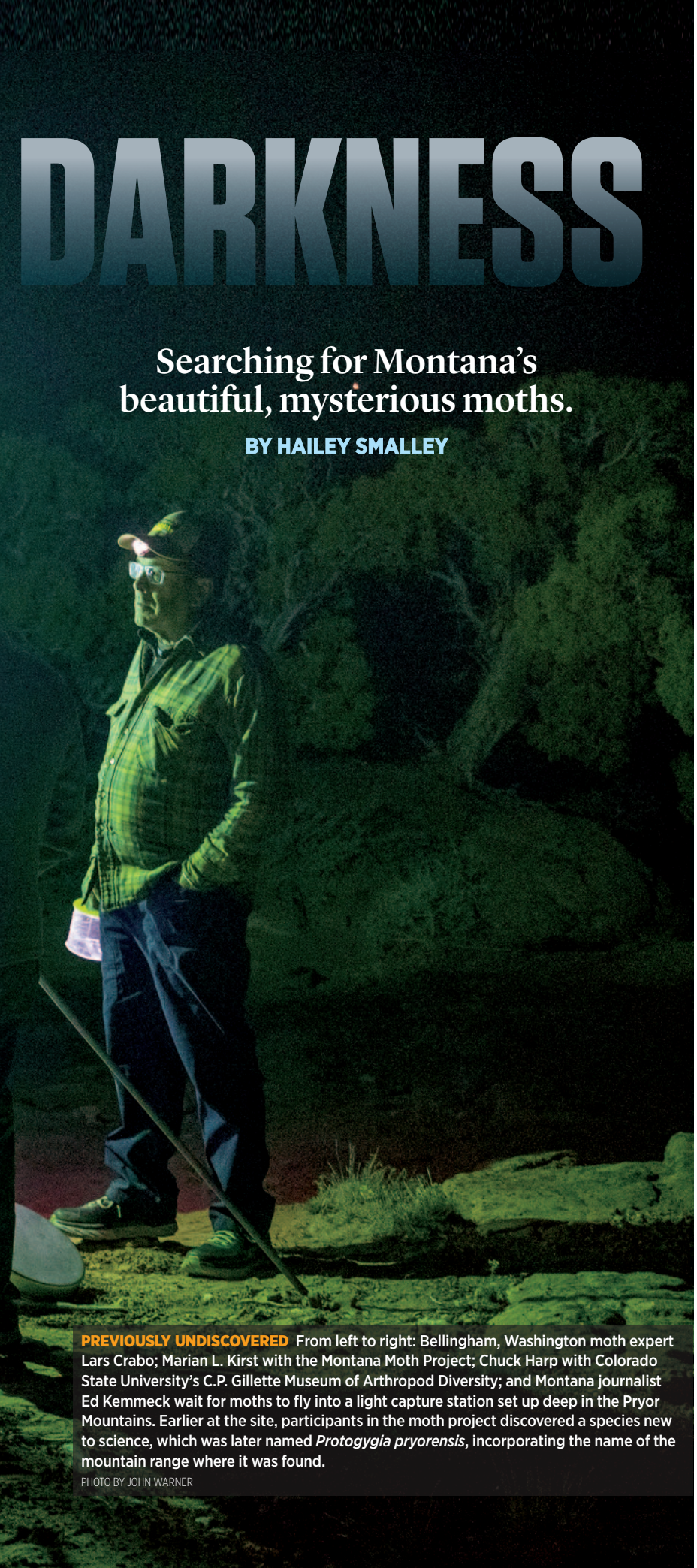
PHOTOS: ALLEN MORRIS JONES


DISCOVERIES IN

# DARKNESS

## Searching for Montana's beautiful, mysterious moths.

BY HAILEY SMALLEY



**PREVIOUSLY UNDISCOVERED** From left to right: Bellingham, Washington moth expert Lars Crabo; Marian L. Kirst with the Montana Moth Project; Chuck Harp with Colorado State University's C.P. Gillette Museum of Arthropod Diversity; and Montana journalist Ed Kemmeck wait for moths to fly into a light capture station set up deep in the Pryor Mountains. Earlier at the site, participants in the moth project discovered a species new to science, which was later named *Protogygia pryorensis*, incorporating the name of the mountain range where it was found.

PHOTO BY JOHN WARNER

From a distance, the shadowy human figures standing around a glowing light in a Billings city park late one summer night could be mistaken for campers telling ghost stories by firelight.

But that's not a campfire. And these night owls gathered here aren't sharing spooky tales. They have set up an electric light and are waiting for moths.

Marian L. Kirst often gathers Billings residents in dark corners of the city to look for the nocturnal winged insects. Her purpose is to collect new specimens and introduce people to the unusual hobby of mothing.

"It's like opening a door to a magical fairy kingdom," says Kirst, who works for the Montana Moth Project (MMP).

*"It's like opening a door to a magical fairy kingdom."*

Little is known about the moth kingdom, especially in Montana. The MMP was created to fill the enormous information gaps by collecting, identifying, and preserving moths from as many different Montana counties, habitats, and elevations as possible. In the first survey of its kind in the Treasure State, researchers and volunteers over the past seven years have collected thousands of moths, uncovered several surprises, and further elucidated the ecological importance of these beautiful and mysterious members of the order Lepidoptera.

### FOOD FOR GRIZZLIES

The world is home to around 160,000 named species of moths, compared to only about 17,500 butterfly species. Many scientists believe even more moth species—perhaps hundreds of thousands—have yet to be discovered.

*Hailey Smalley is a science writer in Missoula.*

**40,000 PER DAY** Cutworm moths are just one of hundreds of moth species that live in Montana. Cutworms fly hundreds of miles from distant lowlands to feed on the nectar of subalpine wildflowers. The moths are an essential food source for high-elevation grizzlies, which find them on talus slopes.

In Montana, the winged insects can be found everywhere from windswept prairies to mountain scree fields to porch lights statewide. Like butterflies and bees, many moth species pollinate flowering plants, including crops. Moth caterpillars and winged adults are eaten by animals as diverse as songbirds, trout, and grizzly bears. The spruce moth is a staple for rainbows, browns, and cutthroat on the Big Hole, Bitterroot, and many other rivers in late summer. On high-elevation talus slopes, a single grizzly will eat up to 40,000 cutworm moths each summer day. Billions of these fat-filled insects fly hundreds of miles from distant lowlands to drink the nectar of alpine flowers in mountain meadows.

But while moths are crucial to the health of Montana's ecosystems, Kirst says they often get overshadowed by flashier bugs. "The first thing people say is, 'Oh, you study moths. I've got a million of them dead on my back porch.' It's so sad. These same people, I have no doubt, if I said I studied butterflies, would go, 'Oh, wow.'"

Scientists, too, have long snubbed moths. MMP founder Mat Seidensticker was first struck by the lack of moth research while working as a biologist at the private MPG Ranch in the Bitterroot Valley. An ornithologist by trade, Seidensticker was extracting DNA from owl feces to determine what the birds were eating, only to discover there was no database of moth species in Montana to compare the genetic material to.

*"The first thing people say is, 'Oh, you study moths. I've got a million of them dead on my back porch.'"*

Despite having limited experience in entomology, Seidensticker decided to catalog the region's moth species. Within a year, he had identified over 300 species on the MPG Ranch alone and began to imagine a statewide survey to find and catalog every moth species in Montana.

In 2019, Seidensticker founded the nonprofit Northern Rockies Research and Educational Services, with the MMP as its flagship program. The tiny organization aims to encourage long-term scientific projects with a focus on observing the natural world. Donors include the MPG Ranch, Montana Audubon, Wild Montana, the Lepidopterists' Society, the C.P. Gillette Museum of Arthropod Diversity, and individual donors.

Since Seidensticker's first study in 2017, the MMP has collected more than 33,000 individual specimens from at least one site in all of Montana's 56 counties. Researchers have officially identified more than 1,100 different species. (The Montana Natural Heritage Program has 2,300-plus species listed in its database, but most are unofficial photographic observations.) Among the MMP's collected species are several never before documented in Montana and at least one previously not known to science. In 2021, a few samples Kirst and volunteers collected from the Pryor Mountains were determined to be an entirely new species, which she named *Protogygia pryorensis*. The MMP researchers suspect they have also gathered samples of six or seven other new species and are waiting for confirmation from outside experts.

## PLENTY OF MOTHS

Kirst surveys moths with volunteers mostly in southern and central Montana, while Seidensticker works solo covering the rest of the state. In the warm summer months when moths are most active, he camps in remote areas for days at a time.

I met him near his home outside of Lolo

PHOTOS: STEVEN GNAM

CLOCKWISE FROM TOP LEFT: HAILEY SMALLEY; HAILEY SMALLEY; JOHN ASHLEY; JOHN WARNER

**MOTH MAN** Top left: Montana moth researcher Mat Seidensticker sets up a bucket trap. Founder of the nonprofit Northern Rockies Research and Educational Services, Seidensticker created the Montana Moth Project to survey the state's moth species in each county. Among the species he and others have found: the October thorn moth (above), Montana six-plume moth (below, on lichen), and white-lined sphinx moth (left).

# *Moths of Montana*

1. chickweed geometer | *Haematopis grataria* • 2. narrow-winged midget | *Tarache augustipennis* • 3. western-eyed sphinx | *Smerinthus opthalmica*
4. garden tiger moth | *Arctia caja* • 5. small-eyed sphinx | *Paonias myops* • 6. white underwing | *Catocala relicta* • 7. big poplar sphinx | *Pachysphinx occidentalis*
8. wavy chestnut Y | *Autographa mappa* • 9. western white-ribboned carpet | *Mesoleuca gratulata* • 10. Grote's bertholdia | *Bertholdia trigona*
11. clouded crimson | *Schinia gaurae* • 12. noctuid | *Hyppa brunneicrista* • 13. sagebrush sheepmoth | *Hemileuca hera*

## Illustrations by Jada Fitch

Researchers with the Montana Moth Project are finding that the Treasure State is a treasure trove of these winged insect species. Shown here are some of the prettiest of the roughly 1,100 species officially documented to date.

14. parthenice tiger | *Apantesis parthenice* • 15. erebidae | *Drasteria divergens* • 16. eight-spotted forester | *Alypia octomaculata*
17. scarlet-winged lichen | *Hypoprepia miniata* • 18. lettered habrosyne | *Habrosyne scripta* • 19. Glover's silkmoth | *Hyalophora gloveri*
20. jaguar flower moth | *Schinia jaguarina* • 21. joker | *Feralia jocosa* • 22. zigzag furcula | *Furcula scolopendrina* • 23. white-lined sphinx | *Hyles lineata*
24. sheep moth | *Hemileuca eglanterina* • 25. polyphemus | *Antheraea polyphemus* • 26. snowia | *Snowia montanaria* • 27. herald | *Scoliopteryx libatrix*

in the Bitterroot Mountain foothills to experience moth field research firsthand. It was late September, and the nights were already getting cool, but Seidensticker assured me we would catch plenty of moths.

After years of practice, the biologist had devised several methods of attracting and catching moths using household objects. One was a "bucket trap": a large plastic funnel set atop a 5-gallon plastic container with two large plastic sheets positioned above the funnel and a lightbulb between the sheets.

No one knows for sure why some moths are attracted to lights. Whatever the reason, Seidensticker said, moths would fly toward his artificial light, and then, disoriented, flutter into the sheets. They would then tumble down the funnel into the bucket, where they would quickly suffocate from ethyl acetate, the potent main ingredient in nail polish remover.

*"There's a whole topography on a moth."*

For moths attracted more to scent than light, Seidensticker's second type of trap involved draping strips of cloth soaked in a pungent mixture of molasses, applesauce, and beer onto tree branches. The goo acted like a glue trap, ensnaring moths.

Seidensticker's third trap was a white sheet clamped to an upright metal frame, illuminated from behind by two bright generator-powered lights. As darkness descended, we sat on camp chairs and waited.

For the first half hour, nothing happened. The forest loomed around us, silent and dark and seemingly empty. Then my eyes caught a flurry of movement, so quick it seemed like an illusion. A moment later, the moth was back, flapping its wings and frantically scrambling across the sheet in search of the light source. Seidensticker leaped up from his chair and deftly scooped the insect into a jar of ethyl acetate.

"There's a whole topography on a moth," Seidensticker said as he tilted the jar toward me to show the landscape of its motionless form. Swirls of brown traced over dusty yellow wings to form patterns resembling tree bark. The tiny scales shimmered in the residual light, as did its jet black eyes, no bigger than pinheads. Seidensticker identified it as an October thorn moth, a common species in western Montana during autumn.

In a typical night, Seidensticker says, he might oversee the traps until midnight, catch a few hours of sleep in his tent, then return to his vigil before sunrise. Afterward, he sifts through the buckets and tosses out damaged specimens. The rest, including the October thorn moth we had admired, he ships to Chuck Harp.

**PRESERVED FOR SCIENCE** A collection of *Stenoporpia macdunnoughi*, one of Montana's geometrid moth species, at the Gillette Museum of Arthropod Diversity at Colorado State University.

TOP: KATHRYN SCOTT/*THE COLORADO SUN*; BELOW: SHUTTERSTOCK

## Differentiating Moths from Butterflies

BUTTERFLIES

Closely related, moths and butterflies can be hard to tell apart:

- **Time of day:** Butterflies are most active during the day (diurnal). Most moths are active mainly at night (nocturnal) or at sunset and sunrise (crepuscular), though some species can be seen during the day.
- **Wing position:** While resting, butterflies fold their wings up behind their back—except when they spread them to bask in the sun. Moths usually spread their wings out while they rest or hold them tight against their body. Wing coloration and patterns act as camouflage that protects resting moths from birds and other predators.
- **Antennae:** Butterflies' antennae are narrow, growing rounded and thicker at the end. Moths usually have feathery or thin, threadlike antennae without the rounded club shape at the end.
- **Body shape:** Butterflies are smooth and lean, while moths tend to be stockier with furry-looking bodies.
- **Coloration:** Butterflies have colorful wing patterns. Moths can be equally gorgeous, though most are not as brightly colored as their showier cousins.

Wings spread when resting
Mostly nocturnal
Feathery or needle-straight antennae, lacking thick club shape at end
Body is stockier

MOTHS

**DIVERSE SHAPES, COLORS, AND HABITATS** A selection of various Montana moths: 1) white-lined sphinx, 2) salt marsh tige, 3) yellow-collared scape, 4) white plume, 5) polyphemus, 6) spurge hawkmoth, 7) small-eyed sphinx, 8) Rocky Mountain clearwing, 9) spotted datana.

CLOCKWISE FROM TOP LEFT: DIANE BROWDER; NATHAN COOPER; DANIEL ELLISON; NIKKI YANCEY; JULIE BETTS; DANIEL ELLISON; SHEILA RUBLE; SHEILA RUBLE; JEREMIE HOLLMAN

## MOTH MUSEUM

After retiring from a successful career managing department stores, Chuck Harp pursued his first love: lepidoptery. He now manages the Colorado State University's C.P. Gillette Museum of Arthropod Diversity, which holds one of the largest insect collections in the West, including the MMP's growing number of specimens.

In the basement that houses the museum, Harp removes a takeout container from the freezer and opens it to reveal what he jokingly calls the "moth lasagna" inside. To protect the delicate bodies of dead moths during their postal journey, Kirst and Seidensticker pack specimens between layers of cotton and tissue. Harp pulls back the material and carefully extracts each sample. With gentle and precise movements, he extends each moth's wings so the markings are clearly visible before securing the fully splayed insects to a block of wood with pins and wax paper.

After a few weeks, when the moths have fully dried, Harp will remove the specimens and pin them in display cases, which are stored in tall metal lockers.

Harp believes that the MMP's collection could serve as an important baseline for ecologists. Having an accurate picture of species diversity is crucial to crafting conservation plans, and future researchers may be able to revisit the MMP's collection decades from now to see how different moth species, abundance, and locales have changed over time.

The loss of a species could indicate pollutants in the environment or habitat degradation. New or increased numbers of species could signal ecological improvements, he says.

For his part, Seidensticker says the promise of expanding the scientific understanding of Montana's ecology motivates him to continue searching for whatever moths he might find. While he may have happened upon the moth kingdom by accident, he says he plans to continue mothing for many years to come.

"This is something I'm going to do until I die," Seidensticker says. "I just want to be out there doing what I love and leave behind something that contributes to our understanding of the world."

# EYES IN THE SKY

# FWP's "Air Force" takes fish and wildlife management to a higher level

*Story and photos by Allen Morris Jones*

Taking off in a helicopter, if you've never done it before, is anticlimactic. There's no sense of acceleration as with fixed-wing aircraft. No sense of ceremony as on commercial flights ("This is your captain speaking..."). You're strapped in, belts over your shoulders, helmet on, and a microphone snug against your lips. Then you feel a wobble. The rotor hits a higher pitch, and it seems like you've left the ground. Straight up at first, then tilting away. It's not until you start picking up speed and the ground begins to blur that the experience starts to sink in. *Dang, we're flying.*

It's before dawn as we leave the Helena Regional Airport, the sun still 10 minutes from rising, Montana Fish, Wildlife & Parks chief pilot Joe Rahn at the stick. We are flying to Stanford, southeast of Great Falls, to pick up an FWP biologist for a spring mule deer survey, and we'll be flying over the Little Belts and the Smith River canyon.

Rahn asks, "How fast do you think we're going right now?"

I glance down. Smoke from a controlled burn blurs the landscape below.

"Hard to tell. Maybe 80 miles an hour?"

Rahn said, "Ground speed 138."

Rahn is a compact man. Condensed. A veteran of the Iraq War, he flew C-23 Sherpas—military transport airplanes—and has stories about taking bullet holes in the fuselage ("We took a lot of small arms fire"), hugging the ground at 80 feet to avoid stinger missiles. Before that he flew helicopters for the U.S. Army and Montana Army National Guard, and spent nearly a decade flying the Alaska backcountry. You'd think all that would age a guy, but Rahn looks younger than his 57 years.

I'm here to observe the "green-up" survey. As deer, elk, or pronghorn congregate to nibble on newly emerged vegetation, they're easier to count. From the air, we will be looking at two different "trend areas" in Hunting District 426: Arrow Creek and Coffee Creek.

The biologist, Shane Petch, is particularly interested in fawn recruitment—the percentage of young that survive winter to reach one year old. Strong recruitment often signals an increasing deer or pronghorn population, while weak recruitment means numbers are decreasing.

"After we pick up Shane," Rahn says into his headset, "we'll start running transects. Probably refuel in Lewistown at least twice. It'll be a full day."

## SEEING WHAT'S GOING ON

Data is FWP's lifeblood. To accurately allocate hunting licenses, the agency needs to know how many elk, deer, bighorn sheep, mountain goats, moose, or black bears are in a given area—and whether those populations are trending up or down. An increase often requires offering more tags, especially for the females that drive big game populations. A decrease usually means cutting back on tags for a few years so a population can recover.

To gather that information, FWP maintains an elaborate system of camera traps, game-check stations, and hunter phone surveys. To age animals, biologists count the rings in harvested bighorn sheep horns and the teeth in deer and elk.

One of the most important survey tools is the FWP Aviation Unit that Rahn maintains and manages. The fleet consists of four helicopters and four fixed-wing light aircraft. "We're one of the only states that maintains its own fleet," Rahn says. "Other states mostly contract it out." This makes sense because Montana is so big with so many remote areas. To fly these aircraft, FWP keeps two full-time pilots on staff—Rahn, based in Helena, and Neil Cadwell, out of Billings—as well as a number of contractors and part-timers.

The helicopter we are in now, an AStar, had been owned by a wealthy family in New York. "I started trying to obtain it seven years ago," says Rahn. "Finally found the budget for it and flew it back to Montana myself."

Among other duties as fleet leader, Rahn arranges fuel purchases, schedules pilots, and coordinates their schedules with the biologists and game wardens who need to work from the air.

The most important part of his work is safety. "My main job is to keep people alive," he says.

**HIGHLY VISIBLE** Though biologists and pilots can't observe every deer in a hunting district, they can spot animals that hunters and landowners may never see, providing FWP with insight into population status and trends.

*Allen Morris Jones is a novelist, editor, and publisher in Bozeman.*

**“We’re one of the only states that maintains its own fleet.”**

**EXPERIENCED AND SEASONED** FWP chief pilot Joe Rahn flew military transport airplanes during the Iraq War, flew helicopters for the U.S. Army, and spent time as a bush pilot in Alaska.

Ken McDonald, head of FWP’s Wildlife Division, agrees. “The type of flying done for wildlife surveys and fish stocking, flying low and slow, is dangerous. Our department emphasizes, stresses, and stresses some more: safety.”

That means following maintenance schedules and checks, flying only when pilots determine that conditions are safe, and not taking unnecessary chances or skimping on maintenance, McDonald explains.

## FAWNS DOWN BELOW

Rahn grew up in Great Falls—his father was a U.S. Marine pilot at Malstrom Air Force Base—and as a kid spent time hunting Arrow Creek, southeast of the Highwood Mountains. The ground we would be flying over was familiar territory.

After picking up Petch in Stanford, Rahn starts flying his transects—short east-west passes. Low to the ground, he follows the rollercoaster ups and downs of the foothills. Deer run a few hundred feet below us, then stand befuddled. The transects are mapped in real time on Rahn’s GPS unit.

Petch narrates his count into the voice memo app on his phone, held close to his mouth to drown the sound of the rotors. Occasionally, he checks with Rahn to verify a number. As we pass over a small group of mule deer, he says, “I got one, two, three does. Aaand . . . two fawns. Yeah?”

“I get that, too,” Rahn replies.

Petch had been hired only the year before, but there was already a collegial rapport between him and the pilot. Rahn dips the helicopter quick to one side. “I need to go back to this corner. See that one lying out there in the open? There’s more below her in the brush. Let’s flush ’em out.”

Petch checks his iPad where he’s been plugging in waypoints. “Yeah, we haven’t been here yet.”

By the end of the day, Petch and Rahn have counted 538 mule deer in 85 separate groups: 372 adults and 166 fawns for a ratio of 44.6 fawns per 100 adults. They’ve also spotted coyotes and elk here and there and some sharp-tailed grouse on a lek. The deer numbers are down a bit from previous years but still healthy. All good data.

The biologist and pilot aren’t trying to tally every deer in the area, impossible even from a chopper. Instead, they fly the same predetermined transects each year to get samples that represent the larger populations. The same process is used to count moose in northwestern Montana, bighorn sheep in the Missouri River Breaks, and mountain goats in the Absarokas.

From the air, wildlife biologists can also see how healthy the animals appear, watch the escape routes and hiding cover they use, and observe other behavior not visible from ground surveys. The aircraft allow them to cover large areas of public and private land that would otherwise be inaccessible.

The FWP fleet also carries staff to distant locales and transports research equipment into the backcountry.

“We use the fleet to look at golden eagle nesting,” McDonald says. “We determine the reproductive success of wolves. We locate sage-grouse leks and check on the compliance of leases and other habitat projects. GPS collars have helped reduce the need for aerial telemetry, but they can’t tell us how many grizzly cubs are with their mom.”

The aircraft also stock fish.

## IT’S RAINING TROUT

If you’re an angler in Montana, you might keep a mental log of the backcountry lakes where you’ve managed to catch a fish or two. At 9,000 feet in the Beartooths, hiking past a little lake, you may see a blip of a trout rise. How’d that fish get there, you might wonder.

In early August, I meet fish biologist Chris Phillips and fish culturist Tim Helwick at the

small airport in Red Lodge. Both work at the Yellowstone River Trout Hatchery in Big Timber, one of 12 FWP hatcheries. In the grass off the edge of the runway, they wait by a pickup rigged with an oxygenated fish tank. Neil Cadwell, FWP's other full-time pilot, is flying in from Billings. A hand-cranked fuel tank sits nearby in overgrown grass.

Phillips and Helwick primarily raise Yellowstone cutthroat. Today's four fish drops aim to move about 32,000 fingerlings into four different high-mountain lakes in the Beartooths. "The agency stocks 35 to 40 lakes in a given year," Phillips says. "And there's about 300 lakes across western and south-central Montana in the rotation."

After Cadwell lands his chopper, the three men began moving fish from tank to helicopter. This will eventually be a sophisticated 21st-century operation, but the day starts with an old-fashioned bucket line.

Four metal fish tanks have been fitted into the helicopter, replacing the backseats. Each tank holds 14 gallons of water and roughly 3,000 fingerlings. Cadwell helped design the tanks, with an oxygen system in each one to keep the fish alive. Each tank is hinged at the bottom and wired into a control panel. By pressing a button, Cadwell can make one of the four bottoms flip down, dumping fish and water in a lake below.

I ride beside Cadwell on the way to Upper Aero and Avalanche lakes on the Beartooth Plateau north of Cooke City. It's mostly treeless, windswept country, practically featureless from above. I recognize a few landmarks (Impasse Falls) but then am lost. Cadwell, of course, knows exactly where we are.

Flying into Avalanche Lake, he says, "See how the wind's coming down from the head end there? I need to come around so we can make our approach from the other side."

"How low do you need to be for the fish to survive?" I ask.

**SPECIAL DELIVERY** FWP stocks roughly 300 mountain lakes because the waters lack low-gradient tributaries where trout can spawn and reproduce naturally. Top: unloading trout fingerlings from a hatchery truck into tanks in the FWP helicopter. Above: Approaching a lake in the Beartooth Mountains.

"Well, they drop right along with the column of water. So we can be pretty high. If there's flight obstructions, if I can't get down past the trees, for instance, there's still good survivability."

For this fish drop, Cadwell says I can do the honors.

"Okay. Release on my mark. Ready?" He slows and tilts toward the water. "Release."

I push the button. There's no click, no sound, no indication that the release was successful. But Cadwell says, in a formal tone, watching from the side, "L-one is away."

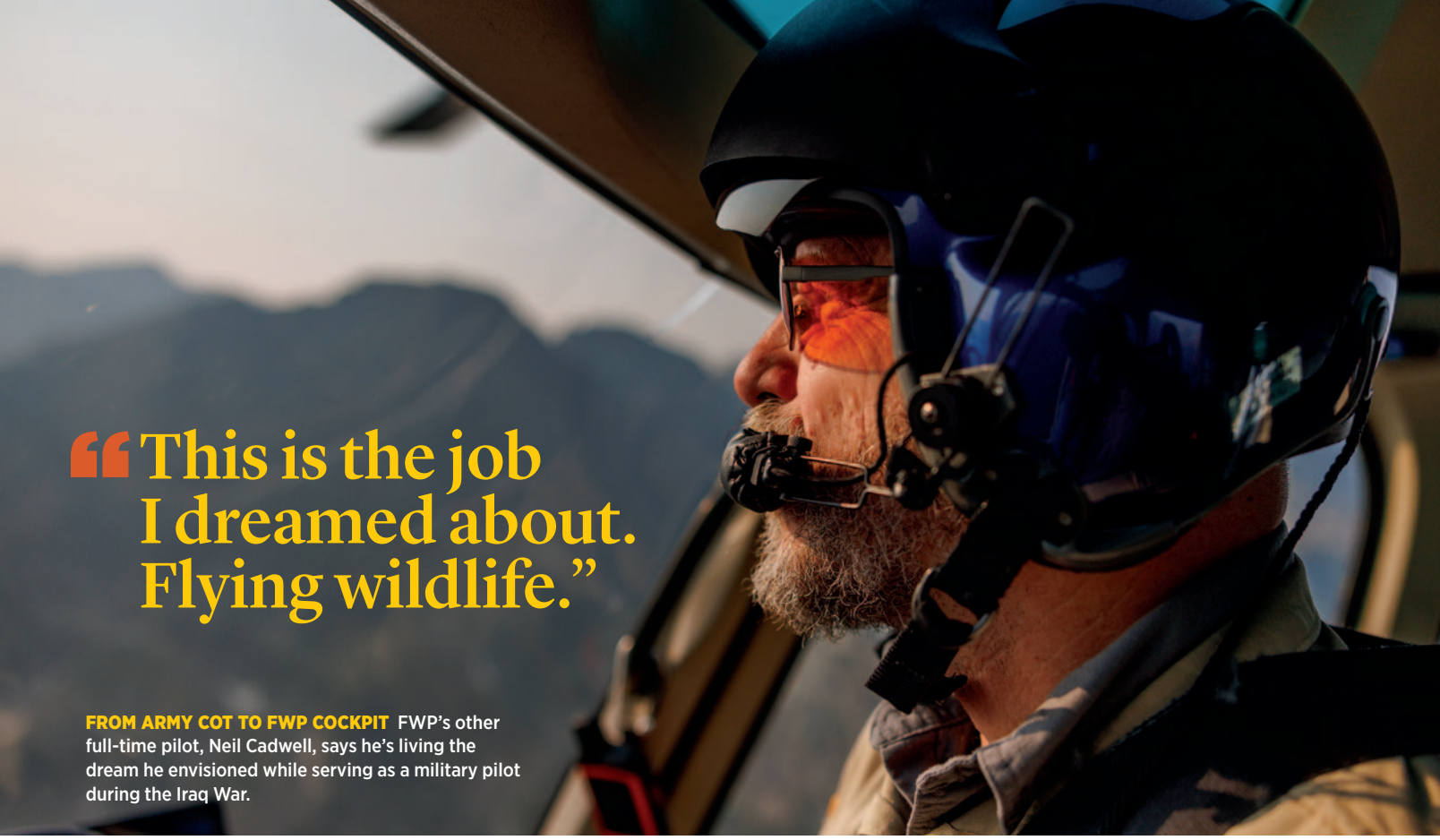
Glancing behind my seat, I see that the forwardmost tank on the left is now empty. Three thousand fish, just like that. In a few years, Avalanche Lake below Granite Peak will provide a nice overnight destination for a few anglers and their pack rods.

**PROUD HISTORY** FWP's storied Aviation Unit dates back to the mid-20th century. Shown here is Ralph Cooper, the agency's first chief pilot, next to fish-planting equipment designed for the Cessna 180, circa 1960. As are today's aircraft, the plane was used by FWP for mountain lake fish stocking, wildlife surveys, and aerial law enforcement.

## LIVING THE DREAM

Cadwell grew up in Red Lodge and Gallatin Gateway. His father had an air-spraying business, and Cadwell himself has been licensed to fly since 1974. After retiring from a career in the U.S. Army, he found his way to FWP. "Lying on a cot in Baghdad? This is the job I dreamed about. Flying wildlife," he says.

Returning from our second drop run, Cadwell shows me Sylvan Lake. "That's where they come for golden trout eggs." Later, he takes me over a swale where one particular GPS-collared grizzly bear used to den. He circles a moose cow he's spotted, bedded down in burnt timber. "These foothills, when we fly in the spring, the



> “This is the job I dreamed about. Flying wildlife.”

**FROM ARMY COT TO FWP COCKPIT** FWP’s other full-time pilot, Neil Cadwell, says he’s living the dream he envisioned while serving as a military pilot during the Iraq War.

moose and black bears are just all over this stuff.” The cow watches us pass. I notice a small-antlered bull farther down the burn.

Cadwell tilts us back around to get another look. “Oh yeah! There he is.” He grins. After all these years of flying, the pilot is still just plain delighted to see a little bull moose. It was infectious. I had to grin back.

The helicopters and airplanes in FWP’s air fleet are tangible assets. The intangible assets, though, are just as valuable. The pilot’s juke and jive with the stick, using his hunter’s instinct to search a patch of cedar that might hide a bighorn sheep or an elk, the slow tilt in altitude-thin air before dropping thousands of fish from a metal belly.

After years of service to the state, the pilots know Montana’s landscape better than anyone, and they know the animals and history of the land, too.

That expertise is invaluable to the credibility of an agency responsible for telling hunters, legislators, landowners, and others how hundreds of wildlife populations across the nation’s fourth-largest state are faring from year to year.

Says McDonald, the wildlife chief, “Without our Aviation Unit and the expertise they bring to game surveys, we’d be just another opinion out there with regards to wildlife population trends.”

## Aircraft likely not bothering wildlife or livestock

**FWP’s air fleet is one of the most visible** of the management and data-gathering tools the agency uses. If you’ve spent any time in Montana’s outdoors, you’ve probably seen one of the agency’s helicopters or small planes flying low, working the terrain.

Given the high visibility of the aircraft, there are inevitably questions. Joe Rahn, Aviation Bureau chief and chief pilot, says that the main concern he hears is from people worried about the stress they perceive an aircraft causes for deer, elk, and other species being surveyed.

“The fact is, though, that our aircraft really have a minimal effect on wildlife,” he says. “We do our surveys as quickly and efficiently as possible, counting the animals and moving on. And doing the surveys year after year has habituated many of the animals to have little or no reaction to the aircraft.”

FWP game survey flight in Paradise Valley.

PAUL QUENEAU

But sometimes wildlife does get spooked. To ensure the planes and helicopters don’t ruin someone’s hunt, FWP suspends survey flights in November. “We may do emergency work or transportation flights then, but for the most part the fleet is grounded during big game rifle season,” Rahn says.

FWP also receives occasional complaints from ranchers who believe the low-flying aircraft are alarming their livestock. “I understand their concern, but in 20 years of doing this work, I have yet to see a cow react by taking more than a few steps,” Rahn says. “A calf will run to its mother, but that’s about it. Most of the livestock-related calls we get are usually from curious ranchers that haven’t seen our aircraft before. I call them back and explain what we’re doing.”

Rahn is sympathetic to the public’s concerns and questions. “What I want people to know is that we’re out there doing necessary work for the department with the least impact we can manage. We’re aware of their concerns and try to be as courteous and cause the least amount of disruption as possible.”

# BRIMMING WITH EVEN MORE POTENTIAL

Supporters say Montana's popular Upland Game Bird Enhancement Program could be delivering even more wildlife habitat, hunting access, and durable relationships between landowners and FWP. By Andrew McKean

Of the approximately 700,000 acres of Montana fields and forests enrolled in Montana Fish, Wildlife & Parks' Upland Game Bird Enhancement Program (UGBEP), the modest 10 acres in northeastern Montana that Emery Brelje plants every year represents far more than its size indicates.

It's a plot on the Sheridan County farm his grandfather bought in 1914, and while the rest of the home place is leased to neighbors for wheat production, Brelje and his brother dutifully plant the little field with the same grain drill their grandfather used, pulled by a tractor that was nearly new in 1960.

The Brelje brothers sow a bird-friendly seed mix provided by FWP, and they get an annual payment through the UGBEP for providing upland bird habitat and allowing hunters on their property. For Emery, who now lives in Glasgow but returns to the home place every bird season, the more durable compensation is seeing abundant wildlife on the farm where he grew up.

"When I was a kid, we used to have to travel 10 miles or more to find sharp-tailed grouse," he says, "but now they're just about everywhere, and it makes me smile when I see barley in a sharptail's crop, because I know they've been feeding in our plot."

*Andrew McKean, who lives on a ranch near Glasgow, is the hunting editor of* Outdoor Life.

## LEGISLATIVE ACTION

Brelje has a highly personal reason for participating in the Upland Game Bird Enhancement Program—a passion for the land and its wildlife shared by most cooperators in the 37-year-old program.

The UGBEP got its start in the 1980s after an especially hard winter in extreme northeastern Montana, with deep snow drifting into pheasant-sheltering tree rows and covering spent grain in fields, native grass seed, and brush berries. Countless pheasants, gray (Hungarian) partridge, and even hardy native sharptails died that winter. Landowners looked to the state to plant pen-reared pheasants and help improve upland habitat so birds might survive subsequent tough winters on a landscape whose sheltering native grasslands and cattail marshes were increasingly being converted to grain production.

The 1987 Montana Legislature responded by creating the UGBEP, which allowed landowners to feed winter-weakened pheasants and other game birds and release pen-raised pheasants to supplement anemic populations. But the program soon shifted to investing in habitat.

"The thinking evolved that resilient habitat is the driver not only of Montana's upland bird populations, but a whole mosaic of other wildlife, like songbirds, small mammals, raptors, and deer," says Debbie Hohler, who leads the UGBEP from FWP's Helena headquarters. "The program's tools and ways of either creating or improving existing habitat have changed with the times, but the goal is pretty defined: Good projects are investments in the future."

**TEAM PLAYERS** Emery Brelje, who with his brother owns property in Sheridan County, visits with Ken Plourde, an FWP wildlife habitat biologist with the department's Upland Game Bird Enhancement Program. The Breljes have worked with Plourde since 2017 to improve food and cover on their land, which is enrolled in the habitat program.

ANDREW MCKEAN

Early habitat work included planting more wind-blocking tree rows, conserving grassy tangles of dense nesting cover, and establishing winter food plots like those on the Brelje place. Over time the program expanded from Montana's grain-and-ringneck belt to ranch country. Grazing systems were developed jointly by FWP and ranchers to rotate cattle through a series of pastures, benefiting not only native rangeland but also sage-grouse and other wildlife that depend on it.

Over its four decades, the UGBEP has enlarged and extended federal Conservation Reserve Program (CRP) grassland enrollments, paid hay producers to leave some forage unmowed and unbaled to provide cover for wild turkey and pheasant poults, and even rejuvenated aspen groves to benefit forest-dwelling ruffed grouse.

What all these successful projects share is strong and durable cooperation between FWP field staff and Montana landowners.

"To my mind, every project that's well put together and has a good cooperator and improves our grasslands is a worthy project," says Representative Tom France, a state legislator from Missoula who sits on the 12-member UGBEP citizens advisory council that helps steer priorities and oversees the program. France is also an avid upland hunter. "The program has done a lot of great habitat work, but I think its social benefits are just as valuable. It's been one of the best programs FWP has ever had to strengthen bonds between landowners, FWP, and hunters."

## BASED ON A PROMISE

The program works by using upland hunters' license fees to fund habitat work that pro-

duces more birds for future hunting seasons. Since its early days, $2 has been earmarked from each resident upland bird license and another $23 from each nonresident license for the program.

If the program's benefit cycle is based on a promise—that license dollars will produce future birds that will produce more license-buying hunters—then its capacity is based on a similar construct. The more that FWP biologists can meet and talk to landowners, the more projects can be established, which often produces more advocates for the program and increased landowner interest and participation.

In its early days, upland projects were often an afterthought of FWP's area wildlife biologists, who also managed mule deer and pronghorn populations and often didn't have time to enter into long conversations and sometimes complicated agreements with landowners about grasslands. The program was slow to grow until the Montana Legislature—urged on by Julie French, a lawmaker from bird-rich Scobey—gave it authority to hire field biologists whose main job is to work with farmers and ranchers to identify, design, and fund habitat projects.

FWP currently has three UGBEP biologists in Regions 4, 6, and 7, covering essentially all of central and eastern Montana.

Meanwhile, the program's budget has slowly grown.

Last year, resident and nonresident licenses contributed $865,816 to the program. Additional revenue comes from a federal Natural Resources Conservation Service Voluntary Public Access-Habitat Incentive Program (VPA-HIP) grant, other federal Farm Bill titles, and monetary and in-kind assistance from conservation groups like Pheasants Forever and the National Wild Turkey Federation.

The element that keeps hunters involved as the third partner in these habitat agreements is access. Every UGBEP project has some public hunting component that's detailed in an annual booklet FWP produces and distributes widely. The "UGBEP Project Access Guide," also available online, provides the location of habitat projects and type and amount of free public access available to hunters. The publication has grown from just a few pages to a thick booklet that upland hunters anticipate every August. In the field, properties are identified by signs that welcome hunters.

> **"There's something more that motivates most cooperators. It's a deeper connection to place and to the land, and a genuine desire to both improve it and share it."**

## DEEPER CONNECTION

Trent Kleppen describes himself as "a dirt bag bird hunter."

The Sheridan County native, who grew up chasing pheasants and sharptails on land that was rapidly being converted from prairie grass to wheat, became an early UGBEP advocate because, he says, "that's where the birds were."

Kleppen now chairs the program's advisory council, and says its benefits extend well beyond the transactional elements of paying landowners to produce bird-friendly habitat that attracts hunters.

"There's something more that motivates most cooperators," he says. "It's a deeper connection to place and to the land, and a genuine desire to both improve it and share it."

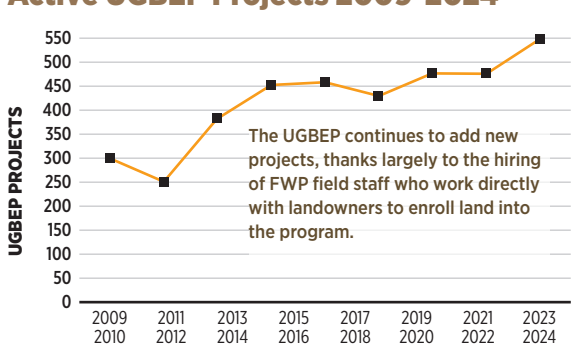
Brelje, the Sheridan County UGBEP cooperator, gets a bit emotional when he describes his motivation.

"I guess I'm sentimental," he says. "I like hearing the pheasants squawk in the morning or having a covey of Huns flush up and scare me. There'd probably be some birds around regardless, but I'd like to think we help. We'd likely plant our little food plot without being in the program, but FWP provides the seed mix, which is not inexpensive, and it's nice to be a part of something bigger."

Brelje's primary contact is FWP's Ken Plourde, a UGBEP biologist based in Flaxville, a little prairie town between Plentywood and Scobey on what locals call the "real" Hi-Line—Montana Highway 5—which parallels the Saskatchewan border across

FROM TOP: SHUTTERSTOCK; THOM BRIDGE

## Active UGBEP Projects 2009-2024




SOURCE: MONTANA FWP

Average habitat acreage:
**355,000**
per biennium

Average access acreage:
**650,000**
per biennium

**Right: A hunter sends his dog into thick cover to root out a rooster or two at a UGBEP habitat enhancement project northeast of Conrad.**

**BENEFITS OF ENHANCED UPLANDS** Clockwise from top: Harvesting a rooster from a CRP field in northeastern Montana. As Congress has reduced funding for the federal Conservation Reserve Program in Montana, FWP has worked on filling the upland game bird habitat gaps with state programs; a French Britanny points a covey of gray (Hungarian) partridge; a Lab brings back a mouthful of rooster; a hunter takes a snap shot at a pheasant weaving through a stand of cottonwoods.

northern Sheridan and Daniels counties.

Plourde's job is to meet with landowners across FWP's Region 6, discuss the merits and requirements of the program, and administer habitat contracts. One of the foundational aspects of the program is that landowners contribute the on-the-ground work, whether planting seed, tilling, or even not plowing and planting some of their less-productive ag land to preserve bird habitat.

Plourde says the program is constantly evolving, following wider trends in agriculture, place-specific habitat needs, and individual landowners' production priorities. Northeastern Montana producers are increasingly interested in improving soil health, and practices such as cover-cropping, pollinator plantings (seeding wildflowers that attract bees and butterflies), and no-till planting can improve conditions for commodity grains as well as upland birds. The UGBEP initially focused mainly on establishing and maintaining CRP and other grasslands. Recently, the program has provided financial incentives for farmers to do "stripper-heading," which harvests only the wheat grain heads and leaves tall stubble to hold snow and provide security cover for upland birds. "It's a win both for the birds and for next year's wheat crop," says Plourde.

## GREAT POTENTIAL

From his view on the UGBEP council and in the Montana Legislature, France sees the program as an investment that pays habitat and relationship dividends.

"I think its real strength is in providing a basis for a conversation between FWP staff and producers that then becomes a partnership," he says. "I'm interested in making sure the program has the capacity to incorporate conservation practices on working land as the needs of producers change and grow with the times."

France, a Democrat, says he and other lawmakers representing both political parties would like to see the program continue to grow and innovate."It's still relatively small in scale when you consider that most UGBEP projects are measured in a few hundred or a few thousand acres across areas of Montana that cover millions of acres," France says. "It's limited by funding and field staff. The program has a current biennial budget of $2.5 million. I'd like to see how many projects we could do if we doubled that and hired more people like Ken Plourde to work with landowners."

CLOCKWISE FROM TOP: LEFT: STEVEN OEHLENSCHLAGER; LISA WRIGHT; DAWN WILSON; JOEL MAES

**DRIVE-BY SHOOTING**
An x-ray of a dead great horned owl found near Corvallis in 2022 shows multiple shotgun pellets in the body that were likely fatal. Though killing raptors has been a federal crime for more than half a century, people in Montana and other states continue to shoot owls and other birds of prey.
PHOTO BY JESSE VARNADO/ WILD SKIES RAPTOR CENTER

# BAD SHOTS

**Despite federal protections and the risk of jail time for perpetrators, raptors across the West are still being killed for "fun" and profit.**

by Julie Lue

The story spread from Montana to news outlets across the country, reminding Americans that illegal wildlife trade extends far beyond exotic animals like rhinos and pangolins.

In December 2023, two men were charged in U.S. District Court in Missoula with the unlawful trafficking of bald and golden eagles. According to the indictment, the birds were killed on the Flathead Reservation and "elsewhere"—in what one of the codefendent referred to as a "killing spree"—illegally sold on the black market, and then shipped to buyers in the United States and other countries. One detail in the charging document was especially notable, alleging that "in total, the defendants killed approximately 3,600 birds, including eagles."

While this number is startling, the illegal shooting of eagles and other raptors is not rare. Despite protections offered by federal laws, the birds continue to be killed throughout the West—whether they're baited, shot, and sold for parts, or shot off trees and power poles and left to die where they fall.

## A COMMON OCCURRENCE

While poaching rings make headlines, the typical shot raptor is more like the great-horned owl found this past spring near Stevensville, perching on a fencepost out in the open all day—strange behavior for a nocturnal hunter. X-rays revealed a broken wing packing more than a dozen metal fragments. "The bird had been down a while, so she was very skinny," says Brooke Tanner, executive director of Wild Skies Raptor Center in Potomac, where the owl was taken for rehabilitation.

Tanner says she sees mostly great-horned owls and red-tailed hawks with gunshot injuries, but any species can be a target. "In the last ten years, we know of at least 43 raptors that have been shot, ranging from large ones like bald and golden eagles to little ones like sharp-shinned hawks and merlins," she says.

During the past decade, the Montana Raptor Conservation Center (MRCC) in Bozeman, which sees birds from as far away as the North Dakota border, took in 65 gunshot raptors, says Jordan Spyke, the center's director of operations and rescue. In one case, MRCC staff spent more than two months rehabilitating a great gray owl hit by a car in Yellowstone National Park. Two days after it was released back in the park, the owl was found shot dead near Gardiner. "It was heartbreaking," says Spyke.

Stories like this are common. Two red-tailed hawks shot out of a tree on open land within the Bozeman city limits. One of a beloved pair of ospreys shot off a crane at Pioneer Log and Timber Homes near Victor, where the birds had nested for years in a wooden box that workers built on the boom. A snowy owl, a peregrine falcon, a bald eagle—all found with gunshot injuries.

Occasionally, x-rays show that a raptor has been shot two different times, says Rob Domenech, executive director of the Missoula-based Raptor View Research Institute. "In some of the recently gunshot birds we've recovered, there will be a BB in them from a previous incident that somehow they've survived," he says.

Tanner says the Stevensville owl "should be releasable if the wing heals okay. She'll be here until she can molt to replace the six primary flight feathers that were sheared off." But other birds are often too badly injured to survive or may never make it to a rehab center. Many shot raptors end up dead before they even hit the ground.

All have one thing in common: They have been shot illegally. And it's important to remember, says Brian Lloyd, an FWP game warden in Bozeman, that "where there are conflicts, federal law supersedes state law."

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*Julie Lue is a writer in Florence, in the Bitterroot Valley.*

**HARD TO FATHOM** Above left: During much of the 20th century, ill-informed state bounties led well-meaning conservationists to slaughter thousands of raptors in Montana, Pennsylvania (resident shooters shown here), and other states, despite federal protections. Above right: A 1990s photo of a half-dozen hawks all killed on the same day in Montana's Mission Valley. Facing page: Golden eagle feet recovered by federal wildlife officials in their case against Travis John Branson, who pled guilty to killing more than 200 eagles and hawks, many on the Flathead Indian Reservation.

For that reason, Lloyd says, a Montana state law still on the books allowing people to shoot "predatory hawks and owls" would not hold up in court.

## A FEDERAL OFFENSE

Raptors are protected by several federal laws from the late 19th and early 20th centuries, when hunting for meat or feathers, anti-predator campaigns, and habitat loss combined to drive a wide variety of bird species into steep declines or even extinction.

With the 1918 Migratory Bird Treaty Act (MBTA), Congress recognized that birds needed consistent safeguards as they migrated to different states or countries throughout the year. Originally enacted to codify a treaty with Canada, the MBTA "prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior's U.S. Fish and Wildlife Service" (USFWS). Amended several times to include more species and agreements with Mexico, Japan, and Russia, the MBTA now covers over 1,000 native species, including corvids and raptors, which were added to the list of protected birds in 1972 (see "A Century of Saving Birds," *Montana Outdoors*, July-August 2018).

Eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA), which similarly prohibits "take" without a USFWS permit. Though it only pertained to bald eagles when first passed in 1940, the law was amended in 1962 to include golden eagles, which at the time were still being shot from planes over vast swaths of Texas and New Mexico.

Notably, under the MBTA, even when there is an authorized hunting season for a particular game species, such as a mallard duck or Canada goose, it can't be shot out of season. And both the MBTA and the BGEPA apply not just to birds but also to feathers, nests, and eggs. In fact, it's illegal to possess feathers and parts of protected species, even if the feathers are naturally molted or come from a bird that smacked into your windshield. (Though, according to the USFWS, "exceptions do exist for legally hunted waterfowl or other migratory game birds, and for the use of feathers by Native Americans." The USFWS may also grant permits for possessing feathers and birds for scientific and educational purposes.) It's also unlawful for anyone to buy, sell, or trade feathers of protected species for any reason.

But the law is one thing. Compliance is another.

After one of his transmitter-wearing hawks was shot in the late 1990s, Chad Olson, then a student at the University of Montana, spent two winters looking for dead raptors along roads (mostly following power lines) in the Mission Valley. Now co-owner of a wildlife consulting firm in Laramie, Wyoming, Olson found 126 dead raptors during that period. Of those not too decomposed for necropsy, 84 percent had been shot.

More recently, Eve Thomason and her colleagues at Boise State University went looking for dead birds under power lines in Idaho, Oregon, Utah, and Wyoming. When cause of death could be determined, the researchers found that 66 percent had been shot. For raptors alone, that number climbed to 72 percent—more than three times the percentage that died of electrocution, which is known to be a major cause of mortality.

Another study led by Brian Millsap, now a research scientist at New Mexico State University, followed the fates of golden eagles fitted with transmitters to estimate causes of death for the species' broader population. Researchers found that humans, unintentionally or intentionally, are responsible for an estimated 74 percent of deaths of golden

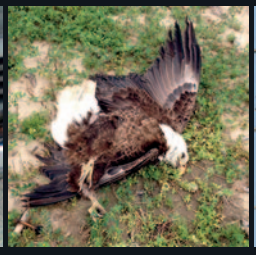
TOP: FROM LEFT:HAWK MOUNTAIN SANCTUARY; CHAD OLSON

## OTHER LETHAL DANGERS

In addition to being shot, birds of prey face a range of threats caused by human development. These include flying into wire fencing, being hit by vehicles on roads, eating poisoned rodents, electrocution on power lines, getting struck by the fast-spinning blades of wind turbines, and becoming tangled in discarded baling twine.

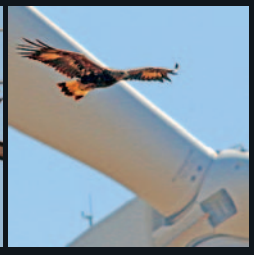
Barbed wire

Vehicle collision



Poison

Power lines



Wind turbines

Baling twine

FROM LEFT: TOM KOERNER/USFWS; WBAY; IUSFWS/SOUTHEAST; NFORMEA; RICK LEWIS; ERICK GREENE

U.S. ATTORNEY'S OFFICE

> **"Not only did Branson kill eagles, but he hacked them into pieces to sell for future profits."**
>
> —Prosecutors with the U.S. Attorney's Office in Montana

eagles over one year old. The leading cause of death? Shooting, followed by collisions, electrocution, and poisoning.

## FRUSTRATING FEATHER TRADE

The word is out about the value of eagles on the black market, says Domenech, the Montana raptor researcher: "If an eagle carrying one of our transmitters goes down along a major highway or interstate, we've got to get to that bird quick or it won't be there." Some poachers set out roadkill for bait, then shoot the eagles from vehicles as the raptors feed.

But those who kill eagles or buy and sell their parts take a big risk. As of publication, one of the codefendants in the Flathead feather-trade case, Travis John Branson of Washington, had pled guilty and was awaiting sentencing. Prosecutors requested "significant imprisonment" and restitution of $777,250 for the deaths of 118 eagles and 107 hawks to which they could tie him through recovered text messages.

In early September, prosecutors wrote, "Not only did Branson kill eagles, but he hacked them into pieces to sell for future profits."

It's unclear how many of the total number referred to in the indictment were killed on the reservation, or how many were eagles.

But losses on any scale are frustrating for wildlife conservation professionals. "We work so hard to protect wildlife, and we do a lot for eagles," says Whisper Camel-Means, who heads the Division of Fish, Wildlife, Recreation and Conservation for the Confederated Salish and Kootenai Tribes (CSKT) on the Flathead Reservation.

Eagles have great cultural and religious significance for many Native Americans; the feathers are often used in ceremonies, to mark special occasions, or for regalia. Members of federally recognized tribes can apply to the National Eagle Repository (where dead eagles are sent from across the country) to receive feathers and parts for religious use. But wait times range from a few months for miscellaneous bald eagle feathers to over a decade for a whole golden eagle.

Camel-Means says the CSKT has also worked hard to obtain a permit to keep dead eagles found locally (though the program is on hold due to risk of spreading avian influenza). The wardens investigate and the birds are scanned to ensure they haven't been shot. Then, in cooperation with the USFWS, they're released to the tribes' Culture Committee, which can use its own judgment in distributing them to tribal members.

## ANTI-PREDATOR SENTIMENT

When profit isn't involved, it's not always obvious what motivates people to shoot raptors. Some may view birds of prey as destructive predators that harm pheasant or fish populations (see "Blaming the Birds," *Montana Outdoors*, May-June 2019). Or they may feel they need to protect their birdfeeder visitors from hawks, their chickens from hawks and owls, or their lambs and calves from eagles.

Others may just be engaging in what Domenech calls "wanton destruction": using raptors for target practice. "One person with a .22 can kill hundreds of birds in a week," he says. "If you get a few people out there doing it, they can have a big effect on a regional level."

This behavior isn't limited to just shooting raptors. At two Idaho conservation areas, scientists found that a third of its transmitter-wearing long-billed curlews—elegant shorebirds that feed on aquatic invertebrates—had been shot.

According to Torrey Ritter, an FWP nongame wildlife biologist in Missoula, the Bitterroot Valley is both an important area for wintering raptors and a shooting hotspot. Problems arise when people move into former timberlands and start raising chickens without owl-proofing the coops. "It's like leaving food out for a grizzly," he says.

The solution is often prevention. "You need to have a plan for living in a place with wildlife," Ritter says. FWP biologists can help, offering suggestions on how to better protect small livestock or prevent sharp-shinned hawks and northern pygmy owls from preying on songbirds at your feeder. And landowners can protect pheasants by removing trees in shelterbelts where raptors perch and replacing them with caragana shrubs or other substantial winter cover.

Eagles are big enough to prey on young calves and lambs, but usually just hang around during calving season and scavenge placentas. If ranchers or others have a problem with an eagle, says Allison Begley, an

**TEACHING KIDS** After it was wounded by a gunshot, this red-tailed hawk was transported to the FWP Wildlife Center in Helena. Rehabilitators saw that a previous gunshot injury had healed on its own. But the more recent injury so damaged a wing that the bird could not be released into the wild. Now named Tula, the hawk is used as an ambassador bird at FWP's Montana WILD Education Center.

FWP avian conservation biologist in Helena, "You'll definitely want to start with a call to your local FWP office. We can redirect you to federal partners as needed."

## RISKS ADD UP

"Even if you take humans out of the equation, it still takes a lot for these birds to get to breeding age and to be able to reproduce and raise young," says Domenech. "But then you add illegal shooting, habitat loss, prey base reductions, and a whole host of human-related threats." The risks add up.

Lloyd says that in the same Bozeman area where the red-tailed hawks were shot, two bald eagles had previously been found dead below their nest, presumably from eating poisoned ground squirrels. While investigating the hawk incident, he also found the decomposed bodies of 5 to 10 other dead raptors.

Raptors frequently collide with vehicles as well as windows, power lines, barbed-wire fences, and wind turbine towers and blades. Larger birds can be electrocuted when they land on old power poles that have not been retrofitted. Many eagles and other scavengers suffer from lead poisoning after ingesting fragments of lead bullets in deer or elk gut piles or shot prairie dogs. Ospreys get tangled and die in baling twine they use for making nests.

## CRITICAL COMPONENTS

Raptors ensure prey species like small rodents don't overpopulate, and provide a valuable service by removing dead animals from the landscape, which can reduce disease transmission. "They are critical components of an ecosystem," says Domenech. "When you lose these capstone or top-tier predators, the ecosystem goes awry."

Many people also just enjoy seeing them—a tiny kestrel hovering over a field, an osprey plunging into a river, a majestic bald eagle perched in a tall cottonwood. Residents and visitors alike marvel at nature's great raptor spectacle along the Rocky Mountain Front, which Domenech says is "host to the world's largest number of migrating golden eagles."

Killing any of those or other raptors for "sport" or profit is illegal and unethical. It's also unfair, not only to people who value birds of prey in the intermountain West but those in other parts of the United States and the Americas. While some raptors live in Montana year-round, others visit from Alaska and Canada while heading to Texas and Mexico—even Central and South America, as far as Argentina.

"Even if there was a reason to—which there definitely isn't—these are not 'our' raptors to kill," says Ritter. "They belong to everyone."

*If you see someone shooting raptors, keep yourself safe and be a good witness by taking detailed notes with date and time, and if possible, description and license numbers of vehicles and description of suspects and their clothing. Then call the 24-hour 1-800-TIP-MONT hotline as soon as possible.*

**DON'T SHOOT** A red-tailed hawk rests on a power pole. These and other raptors control rodent numbers and help keep those and other prey populations in check.

TOP: BRIAN POWERS/MONTANA WILD; DIANNE MCDERMAND

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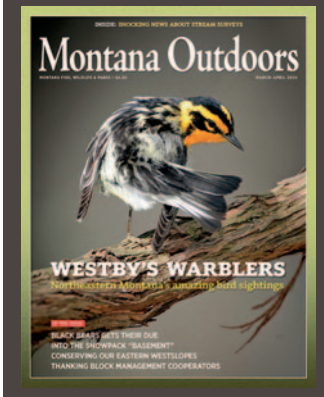

## JANUARY–FEBRUARY 2024
**43rd Annual Photo Issue**

## MARCH–APRIL 2024
**Giving Thanks In February** At Block Management cooperators' dinners each winter, hunters and FWP staff show their gratitude to landowners for providing access and habitat. By Andrew McKean. Photos by Sean R. Heavey

**What's Up Down There?** By regularly monitoring fish populations, FWP crews gather information essential for managing and conserving Montana's world-renowned sport fisheries and imperiled native species. By Paul Queneau

**Below The Snow** The world of wildlife beneath the white surface of winter. By Ellen Horowitz

**A Lifelister's Paradise** Every dedicated Montana birder needs to migrate to the Westby area for a few days in springtime. By Sneed B. Collard III

**Saving Montana's Prairie Trout** FWP biologists fight rainbow trout hybridization to save westslope cutthroat east of the Continental Divide from local extinction. By E. Donnall Thomas, Jr.

**So That's Where They Go** New Motus technology helps biologists learn where birds, small mammals, and even butterflies travel throughout the year. By Sneed B. Collard III

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**SPECIAL ISSUE: A Driver's Guide to Montana's Working Lands** You've heard of "An Insider's Guide" to some place or another? Think of this as "An Outsider's Guide" to rural Montana. By Tom Dickson

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**Giving a Hoot** Angler and guide self-restrictions and FWP "hoot owl" closures provide stressed trout a break during Montana's increasingly hot summers. By E. Donnall Thomas, Jr.

**The Center of Things** In 1972, an artist moved from northern California to Montana's Paradise Valley and found what he was looking for. By Russell Chatham

**12 Little Brown Grassland Birds Every Montanan Should (Kinda) Know** The "good enough" guide to identifying prairie songbirds. By Sneed B. Collard III

**Yeah, Jimmy!** A stray joins a fishing fraternity on the Blackfoot River. By John MacDonald

**Drawn to Nature** Sketching can enrich your outdoor experiences, even if you're not artistically inclined. Article and illustrations by Bethann Garramon Merkle.

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**Making Hay While the Birds Fly** Why upland bird numbers boom and bust, and how to take advantage of the good years and the bad. By Jack Ballard

**Montana's Beloved Browns** Though not native, this hardy and hard-to-catch trout has firmly established itself in the Treasure State. By Jeff Erickson

**Back to Basics: Longbows** By using weapons that differ little from those used thousands of years ago, longbow archers make fair chase even fairer. By E. Donnall Thomas, Jr.

**Back to Basics: Muzzleloaders** Hunting big game animals with firearms similar to what Lewis and Clark carried more than two centuries ago. By Jack Ballard

## NOVEMBER–DECEMBER 2024
**The Affordability Factor** Some ranchers are discovering that FWP conservation easements on for-sale properties can help them expand their operations. By Allen Morris Jones

**Discoveries in Darkness** Searching for Montana's beautiful, mysterious moths. By Hailey Smalley

**Eyes in the Sky** FWP's "Air Force" takes fish and wildlife management to a higher level. Story and photos by Allen Morris Jones

**Brimming With Even More Potential** Supporters say Montana's popular Upland Game Bird Enhancement Program could be delivering even more wildlife habitat, hunting access, and durable relationships between landowners and FWP. By Andrew McKean

**Bad Shots** Despite federal protections and the risk of jail time for perpetrators, raptors across the West are still being killed for "fun" and profit. By Julie Lue

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# Spray, don't slay

By Tom Dickson

This past September, two bowhunters looking for elk north of West Yellowstone shot and killed a charging female grizzly bear, then wounded a juvenile grizzly that also came at them.

In July, a man picking huckleberries north of Columbia Falls fatally shot a charging grizzly he had surprised.

And in May, a man shot and killed a grizzly after feeling threatened while antler hunting near Wolf Creek.

I'm glad all these people and others over the years who killed charging grizzlies are safe. I too have been threatened by a dangerous animal—a mother elephant in Zimbabwe, years ago—and still have occasional nightmares from the incident.

But I think—and research shows—there's a good chance that both people and bears would have survived those encounters if bear spray had been used instead of a handgun.

*Tom Dickson is editor of* Montana Outdoors.

The most extensive study to date on bear self-defense shows that bear spray is more effective than firearms at deterring attacks. The 2012 study showed that a well-placed shot from a .44 handgun or large-caliber elk rifle can definitely deter a charging bear. But researchers also found that the odds of injuring yourself and others in your party decrease significantly if you instead deploy bear spray.

That's because bear self-defense using a firearm requires hitting a fast-charging bear in its vital areas of head, heart, or lungs. "It can be like combat shooting," says Tom Smith, a professor of wildlife science at Brigham Young University and co-author of the article "Efficacy of Bear Deterrent Spray in Alaska," published in the *Journal of Wildlife Management*. "It's easy to miss or, even worse, make a wounding shot."

The only thing more dangerous than a mother grizzly defending its cubs is a wounded mother grizzly defending its cubs. Compare the precision required for a successful firearm defense to spraying a cloud of eye-scalding, nose-burning mist the size of an SUV. The latter stops a charging bear in its tracks and sends it running in the other direction. Even a kid can discharge a bear spray canister.

Smith, Stephen Herrero of the University of Calgary (author of *Bear Attacks: Their Causes and Avoidance*), and two other researchers reviewed 441 incidents of bear attacks in Alaska (grizzly and black). They found that bear spray was more effective than handguns or long guns in deterring attacks. What's more, the researchers found that bears inflicted injuries on humans in 56 percent of the incidents involving firearms, mainly due to the lack of time the shooters had to respond.

Tragically, there were 17 human fatalities in cases when firearms were used as defense, whether the victim was killed by the bear or by human partners trying to defend against the attack.

But out of the 441 incidents where bear spray was used, there were zero human injuries or deaths.

And then there are bear fatalities. Bears died 61 percent of the time when people used firearms, while none died from bear spray.

Making those deaths even more regrettable is that most of the time bears are just bluff charging and wouldn't have followed through, Smith says. Also, most bluff charges come from females with cubs, and the young bears often perish later without protection from their mother, adding to mortality numbers.

Even if you're not a big fan of grizzlies, their preventable deaths are no small matter. The U.S. Fish & Wildlife Service tracks human-caused grizzly mortalities in every state where the federally protected species lives. Each grizzly killed here makes it that much harder for Montana to convince the federal wildlife agency—and, in the future, federal judges ruling on inevitable lawsuits—that grizzlies would be well served by state management.

Feel safer in grizzly country packing a handgun? By all means do so. But consider using it as a backup to the more effective and accessible bear canister carried in a harness across your chest, not as your first line of defense. If a bear does charge, you'll be more likely to save yourself, and the bear, from serious injury or death.

*Watch this video to hear from an 80-year-old elk bowhunter who defended himself from an aggressive grizzly using bear spray this past September.*

ILLUSTRATION BY STAN FELLOWS

# Red fox

## *Vulpes vulpes*

*By Lee Lamb*

The first time I saw a red fox was in 1996 when I lived on the west side of Butte, where I often jogged along an abandoned railroad bed that snaked its way out of town. One summer evening I saw a flash of fur vanish in front of me into the sagebrush beside the path. I stopped and peered over the bank, hoping to catch another glimpse, but no luck.

I continued on to my turnaround spot and then headed back, rounded a corner, and stopped short: Up ahead and 30 feet below the point on the path where I'd seen the furry flash sat an adult red fox and two kits at a den entrance. The trio frolicked for several minutes before retreating into their den. I didn't see the foxes again but heard them yipping and barking on occasion down near the den area. Come fall, they were gone.

### IDENTIFICATION AND ECOLOGY

Meriwether Lewis described the red fox in his journals as "the most beautiful fox in the world." With its rufous-colored coat, black "socks," and bushy, white-tipped tail, the red fox is certainly the most distinctive of Montana's canid species. Color variants do occur in the wild—the "silver fox" is black with white-tipped guard hairs, and the "cross fox" has a cross of brown hairs extending over its shoulders and down its midline—but all share the signature white tip on the tail.

Averaging 11 pounds and 42 inches from nose to tail tip, red foxes resemble a small dog in size. They communicate by bark, growl, and yip rather than by howl, and are primarily nocturnal. Red foxes live in a variety of habitats throughout Montana, but prefer riparian areas and forest edges, and may den in disturbed areas near human habitation.

*Writer Lee Lamb lives in Missoula.*

### DENNING AND REPRODUCTION

Red foxes den only during the breeding season. Vixens, or females, prepare a den site or sites, either digging one on their own or squatting in an unoccupied site. Dens are typically located on a hillside with a good view of the surrounding area or under a haystack or abandoned building. Most measure a few meters long and include a grass-lined chamber for the pups and more chambers for storing food.

Breeding occurs during January and February, producing one litter of four to six pups in March or April. Males (known as dogs) and females work cooperatively to raise their young. Males are the sole provider for the homebound nursing female, but upon weaning both parents bring solid food to the pups until they are ready to tag along with their parents on nightly hunts. Adults may move pups between dens more than once during the first couple of months. Pups leave the den in the fall and are sexually mature their first winter.

Silver phase red fox

**SCIENTIFIC NAME** *Vulpes* is the Latin word for "fox" and "cunning."

### DIET AND FORAGING BEHAVIOR

Red foxes hunt by scent and hearing, preferring rabbits and hares but also feasting on small mammals, birds, eggs, insects, and some plants. Stealthy and smart, they catch prey by sneaking up and pouncing rather than by chasing.

Red foxes are known to hunt cooperatively to flush out prey from patches of vegetation or from culverts. The handsome predators are most active at twilight or at night, but they may hunt during daylight hours in winter and in the spring while rearing pups.

### STATUS AND MANAGEMENT

Red foxes are widely distributed and abundant throughout Montana from dense forests to open grasslands to city parks. While many wildlife species have struggled and even declined with the growth of rural and suburban development, red foxes have adapted and taken advantage of human-altered habitats.

Though a few hundred red foxes are trapped in Montana each year for their lush fur, the activity has no effect on the state's overall populaton.

FROM TOP: CINDY GOEDDEL; TONY CAMPBELL

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Whether it's by fishing, camping, skiing, mountain biking, boating, hiking, wildlife watching, or **harvesting a bull elk near Belfry,** Montana is a state where everyone can find their own way to connect with the natural world. Around here, **the outside is in us all.** PHOTO BY LISA DENSMORE BALLARD


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